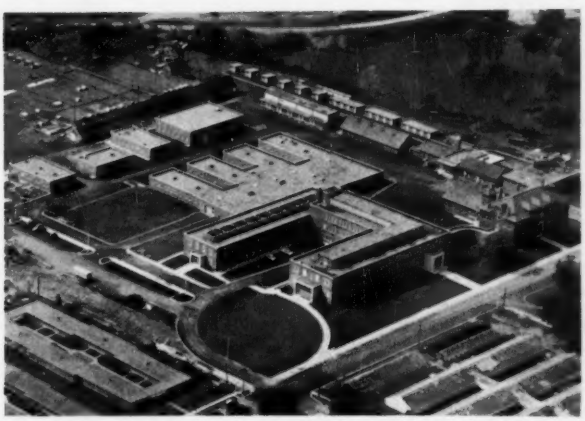
Journal

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION



An aerial view of Purdue's new School of Veterinary Science and Medicine at Lafayette, Ind. The School was dedicated October 12.
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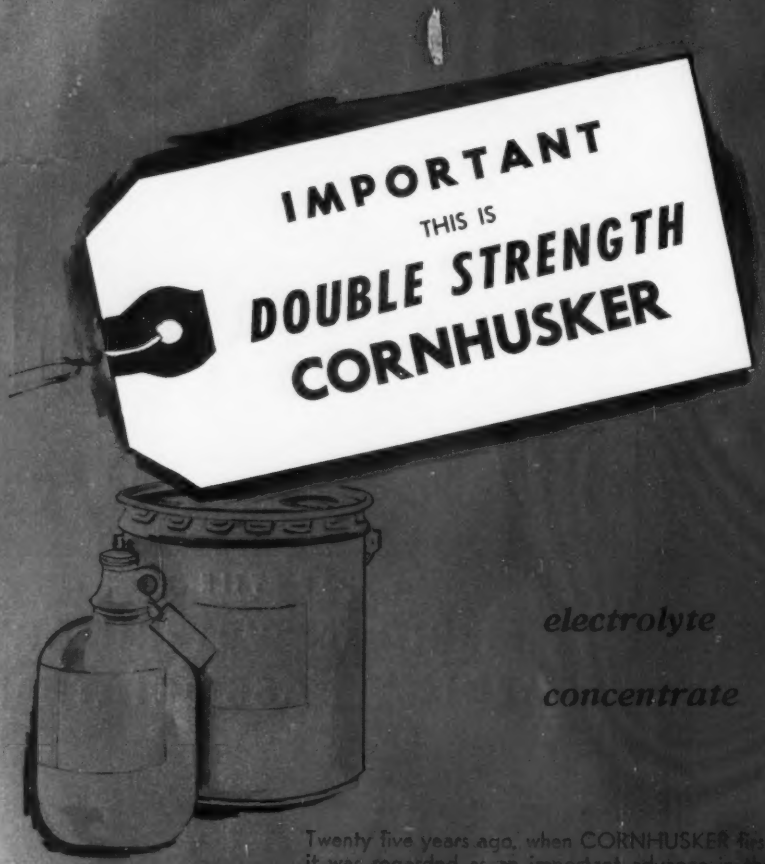


electrolyte

concentrate

Twenty five years ago, when CORNHUSKER first appeared, it was regarded as an important advance in the treatment of dehydration and electrolytic imbalance. The problems are still with us in 1960, and so is CORNHUSKER, as effective as ever.

But even the most excellent of products can be improved: accordingly, we improved CORNHUSKER. Same product, same effectiveness — just greater convenience for you.

CORNHUSKER is now made in a double-strength formula, halving shipping costs and handling. Where you formerly diluted 1 pint with 20 gallons of water, you now dilute a pint of double-strength CORNHUSKER with 40 gallons of water. CORNHUSKER is still best oral treatment for electrolytic imbalance or dehydration caused by shipping, vomition, or diarrhea.

CORNHUSKER is available in gallons, cartoned in four, and in 5 gallon pails at all CS distribution points.

CORN STATES LABORATORIES, INC.
Omaha, Nebraska
SUBSIDIARY OF ELI LILLY AND COMPANY

CS

advertisement

NORDEN VETERINARY NEWS

No. 4

Cats Stay Peaceful With Norden Vaccine

Veterinarians increasingly report excellent results from the injection of Norden's Feline Distemper Vaccine. The painlessness of the injection plus the effectiveness of the vaccine lead to enthusiastic responses.

Typical comments include, "It's phenol free; cats don't jump to the ceiling," and "Top immunity is the desired end result, and we get it with 2 injections of Norden Feline Distemper Vaccine."

Norden Now Supplies Iomycin[1] In Bulk Size

For the general practicing veterinarian, Norden now packages IOMYCIN in 62.5 cc *bulk*. Restoring the Iomycin with the 45 cc of diluent in the second vial results in a solution-suspension of 62.5 cc volume. The bulk vial offers savings in price and time when several animals are to be treated.

Other sizes of Iomycin are *small animal*, 2.5 cc and *regular*, 12.5 cc, each with sterile diluent.

Although an old standby in many practices, numerous case reports from new users on the effectiveness of IOMYCIN continue to be received. This effectiveness results from the antibiotic's unique ability to provide up to 5 times greater concentration in respiratory and mammary tissues with long-lasting therapeutic levels. Indications include mastitis and respiratory infections including calf pneumonia, shipping fever and feline and canine pulmonary infections.

[1]Diethylaminoethylesterpenicillin Ghydriodide with dihydrostreptomycin

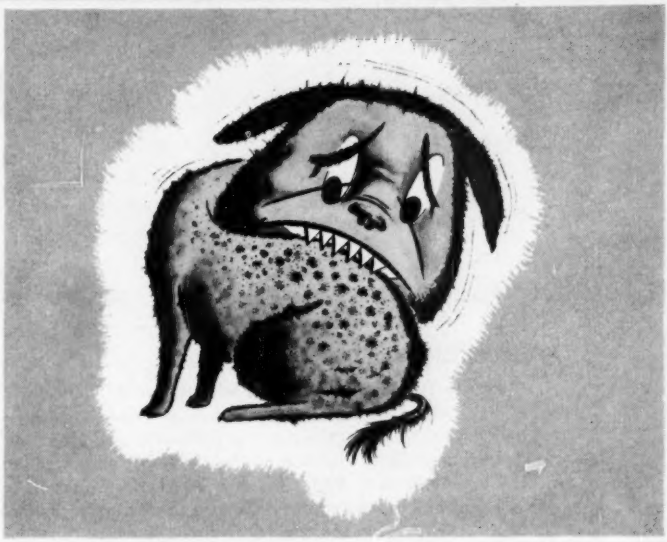
Vi-Sorbin* Overcomes Anorexia in Pets

When the problem is to get a small animal patient to eat, practitioners are finding the answer in Vi-Sorbin, new oral appetite and body builder introduced by Norden Laboratories.

Vi-Sorbin features D-Sorbitol, the unique absorption enhancement factor (AEF). D-Sorbitol results in maximum gastrointestinal absorption of Vi-Sorbin's potent formula, which includes Vitamins B_{12}, B_6, folic acid and ferric pyrophosphate. This means fast, positive response in anemia and anorexia. Indications for Vi-Sorbin also include growth failure in young animals, geriatrics, general debility and convalescence.

Vi-Sorbin is available in pints and gallons.

*Registered trademark of Smith Kline and French Laboratories



Itch-Scratch-Bite Problem Solved by New Temaril*-P (Tablets)

Small animals — plagued by the "itch-scratch-bite" problem — have found a welcome "friend" in TEMARIL-P, new oral antipruritic — anti-inflammatory therapy for skin disorders. And practitioners are finding that Temaril-P stops itching, even in their toughest cases, as nothing else can.

The dramatic effectiveness of Temaril-P is derived from *temaril* (trimeprazine) with specific antipruritic activity for both mild and severe itching. Temaril blocks the passage of the itch sensation — safely and directly.

Temaril-P also offers the steroid, *prednisolone*, for relief of inflammation, but it is not the steroid's specific function to stop itching — nor will it best solve the inflammation problem until temaril stops all itching and scratching. With no scratching to impede relief, response to prednisolone is prompt.

Temaril-P is supplied in 100 tablet bottles. For further information write Norden Laboratories, Inc., Lincoln, Nebr.

Typical case comments of the effectiveness of TEMARIL-P in small animals include:

"Dog has acute eczema and moist areas over loin from self mutilization, yet did not attempt to scratch or chew at bandage after 48 hours."—Virginia.

"The relief is dramatic and is continuing. No noticeable side effects." —Florida.

"Owner reports complete remission of symptoms. No recurrence to date." —Ohio.

"Owner feels the cat is completely changed; no pruritus and excellent coat."—California.

"Definitely relieves pruritus."—Minnesota.

"The hair is beginning to grow in, the sheen is returning to the coat. Owners are particularly pleased because this has been a very stubborn case."—Florida.

*Registered trademark of Smith Kline & French Laboratories

41-Year Old Policy

Since its beginning 41 years ago, Norden Laboratories has constantly maintained a firm policy of "Sales to Graduate Veterinarians *only*."

The motto today, just as in 1919, is: "*Veterinarians are our business — our only business.*"

Journal

OF THE
AMERICAN VETERINARY
MEDICAL ASSOCIATION

Vol. 137 No. 10 Nov. 15, 1960

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the vaccine that produces
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PITMAN-MOORE COMPANY
DIVISION OF ALLIED LABORATORIES, INC. • INDIANAPOLIS 6, INDIANA

Correspondence

Diagnosis Unfair

Sept. 30, 1960

Dear Sir:

The "What Is Your Diagnosis?" radiograph shown on advertising page 35 of the April 15 JOURNAL does not seem to be the one used on the succeeding page, where the diagnosis is given.

Come on fellas—be fair with us!!

s/GERRY B. SCHNELLE, V.M.D.

[Ed. Note: Sorry. As published, the radiographs *did* make it impossible for readers to make a diagnosis. The radiograph on the succeeding page was different, but was of the same leg of the same horse.]

Honorary Membership — Colonel Eanes

Oct. 18, 1960

Dear Sirs:

I feel deeply honored that the American Veterinary Medical Association should elect me to honorary membership (*see* JOURNAL, Sept. 15, p. 382) and am grateful to my friends who presented my name for consideration. My contacts with the members of the veterinary profession have been always pleasant and profitable, and I feel that the contributions which they are making toward the desirable goals in the sciences occupy a large place in the healing arts.

The Association has my every good wish, and I trust that my happy relationship may continue over a long period.

s/RICHARD H. EANES, M.D.
Colonel, U. S. Ret.
Washington, D. C.

New Program for Disease-Free Pigs

A new feeding program for specific pathogen-free pigs has been developed by a feed company in Marshalltown, Iowa.

The feeding program covers the feed requirements for SPF pigs from the incubator through the time they are used for reproduction in commercial herds. The feeds contain no antibiotics or arsenicals.

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M·L·V®

is the registered trademark for Fort Dodge brand modified live virus hog cholera vaccine.
The 'M·L·V' production process is patented, U. S. Patent No. Re-23746.
'M·L·V' is now in its tenth year of field use, its efficacy proved on millions of swine.

FORT DODGE

"AVMA Accomplishments and Goals"

Now that the 97th Annual Convention is history, it is appropriate that we review, briefly, some of the accomplishments of the Association during the past year and a few of its goals for the current year.

Dr. E. E. Leasure, President

Progress was made in the Association's financial position toward reflecting a reserve of more realistic proportions. The Executive Board set aside $35,000 for the reserve fund. The AVMA group insurance trust experienced a continued growth and improved financial position, as set forth in the annual report.

The six councils made substantial progress in their assigned duties: the Judicial Council completed its revision of the "Principles of Veterinary Medical Ethics"; the Research Council prepared a brochure entitled "New Frontiers in Veterinary Medicine" and allocated 11 fellowship grants; the Council on Education continued to make progress in its over-all program as did the other councils.

To cope with the increased activities and duties of the headquarters staff, the Executive Board created and filled three new positions. The AVMA continued to expand and develop its activities in the areas of professional relations and public information, both of which are important in our over-all program. For further information on these items and others, I urge you to read the business proceedings of the 97th convention, which will be mailed to all members in December.

During the current year, the AVMA will be engaged in an ambitious program which includes the expansion of present activities and the initiation of new ones. It is our ambition and desire to see that progress is made on all fronts, including unfinished business of last year, expansion and improvement of the public relations, professional relations, public information, research and education programs, and on the "Prospectus," a survey of the veterinary profession. The House of Delegates referred to the Executive Board, for consideration, study, and recommendation, a proposed amendment to the Constitution and Bylaws which would change the manner of electing the president-elect and also review its action in the matter of banning hospitality rooms at the national convention.

Your officers are aware that our public relations program has not expanded and developed as expected. Therefore, they will exert every effort to see that expansion and development go forward in this area that is so important to the profession.

At the time of the meeting in Denver, your representatives had accepted 41 speaking engagements with allied professional groups and constituent associations. Many more are likely to be scheduled before the next annual convention. These speaking engagements are of considerable importance in bringing about a better understanding of organized veterinary medicine and its relation to the allied medical sciences and other professions.

A long-range program to be initiated this year is to encourage each of our members to take advantage of every opportunity to favorably impress upon our nation's superior high school students the opportunities offered by a career in veterinary medicine. This would be a distinct service to the superior high school student and to the profession as well, as it would assure a continued flow of highly qualified persons into our ranks. We encourage each constituent association to place in every one of its high school libraries a copy of the AVMA booklet, "Veterinary Medicine as a Career."

E E Leasure

Now! From the Hunt Club Laboratories and Test Kennels...

A BETTER DOG FOOD THAN EVER BEFORE!

At Last, Every Dog Under Your Care Can Have Total Nutrition With Quick Assimilation When Fed New Burgerbits Dog Food!

HERE'S WHY—

DEXTRINIZED—Hunt Club's dextrinizing process turns starches into easier-to-digest dextrins . . . helps assimilation of *all* the food value.

APPETIZED—Burgerbits is made with meal processed from plenty of lean red meat and "appetized" with animal fat to provide True Meat Taste.

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PRESSURE PROCESSED—Burgerbits ingredients are pressure cooked to seal in the delicious flavor.

BURGERBITS Offers You Trouble-Free Handling! It mixes quickly and easily with the liquid of your choice. It holds its shape, won't become "mushy" . . . Burgerbits stays firm and crunchy. You'll appreciate the fact that Burgerbits won't "set-up" or stick to feeding pans . . . saves time, labor and trouble!

NO DISTURBANCE FROM CLINIC TO HOME FEEDING

The same fine Burgerbits you feed the dogs under your care is available to your clients at their local supermarkets . . . under the same famous name! By feeding Burgerbits and recommending it to your clients, you can avoid the upsets (and complaints) that so frequently accompany a switch from one food to another!

Hunt Club

Another Fine Product of
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DOG FOOD

KASCO® DOG FOOD is the STANDARD OF EXCELLENCE

✓ **PROTEIN**_____ Dogs require a minimum of 18% protein—Kasco supplies 25%! This is more than enough protein for any stage of your dog's life cycle.

✓ **FAT**_____ Fat adds flavor, helps give shiny, glossy coat; reduces infections. Kasco has 9% animal fat, more than enough to meet all dog needs.

✓ **VITAMINS**_____ Vitamins A, (with improved stability) D and E, along with riboflavin, thiamine, niacin, vitamin B_{12} are in balanced amounts in Kasco Meal.

✓ **MINERALS**_____ These minerals are supplied or furnished by meat and bone meal, iodized salt, dried skimmed milk, fish meal, brewers' dried yeast, and other Kasco ingredients.

✓ **DIGESTIBILITY**__ Ingredients in Kasco are selected for high digestibility—that's why balanced Kasco is so easily digested. That's why Kasco-fed dogs have plenty of pep and condition on surprisingly small food intake. That's why stool condition on Kasco-fed dogs is excellent.

✓ **COST**_____ Kasco Meal is complete. The ingredients will help keep dogs thriving without adding "extras". You'll find Kasco is concentrated so a little goes a long, long way. This means economy. You save dog food dollars with Kasco.

Make comparisons–then you, too, will buy KASCO

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IN BOVINE MASTITIS

CONSISTENT THERAPEUTIC PERFORMANCE

FURACIN® VETERINARY

BRAND OF NITROFURAZONE

A unique, broad-spectrum antibacterial, FURACIN displays decisive effectiveness against mastitis-inducing organisms often resistant to other therapeutic agents. These include such causative pathogens as Staph. aureus, Str. agalactiae, Str. dysgalactiae, Str. uberis, E. coli and Ps. aeruginosa, sensitive to FURACIN.[1,2]

Given early in acute cases, FURACIN acts to prevent severe, irreversible udder damage of chronic mastitis that usually results in fibrosis and permanent loss of the cow's milk-producing potential. Thus, by reversing clinical signs of acute infection and arresting the process of induration, FURACIN helps maintain the integrity of the duct system and re-establish normal milk production levels.

A large animal practitioner who has made FURACIN his primary antimastitis agent, summarizes its principal advantages:

- it is a professional product
- there appears to be no development of bacterial resistance
- it is milk-miscible, thus, seems to be totally distributed throughout the injected quarter
- it does not interfere with healing
- is compatible with other agents[3]

FURACIN SOLUTION VETERINARY SQUEEJET®

Improved intramammary dosage form of FURACIN in a convenient, low-cost single-dose, ready-to-use dispenser.

Contains FURACIN, 0.2%, in a water-miscible base.
Available in SQUEEJETS of 30 cc., boxes of 12.

Note: Milk from cows treated with FURACIN Solution Veterinary should be discarded or used for purposes other than human consumption for at least 24 hours after the last treatment.

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The broad-spectrum activity of FURACIN is combined with the specific antistreptococcal action of penicillin for additive antibacterial effect.

Contains FURACIN, 2%, and procaine penicillin G (13,333 units per cc.) in peanut oil with aluminum stearate, 3%. In rubber-capped vial of 100 cc., applicator tube of 7.5 cc., boxes of 12.

Note: Milk from cows treated with FURACIN-penicillin Gel should be discarded or used for purposes other than human consumption for at least 72 hours after the last treatment.

References: 1. Kakavas, J. C.; Roberts, H. D. B.; deCourcy, S. J., and Ewing, D. L.: J. Am. Vet. M. Ass. 119:203 (Sept.) 1951. 2. Kakavas, J. C.: Antibiotics Annual 1954-1955, New York, Medical Encyclopedia, Inc., 1955, p. 323. 3. Jackson, R. A.: A Program for Mastitis Control. Read at the Second Regional Conference on the Nitrofurans in Veterinary Medicine, Madison, Wisconsin, May 28, 1959, pp. 23-26.

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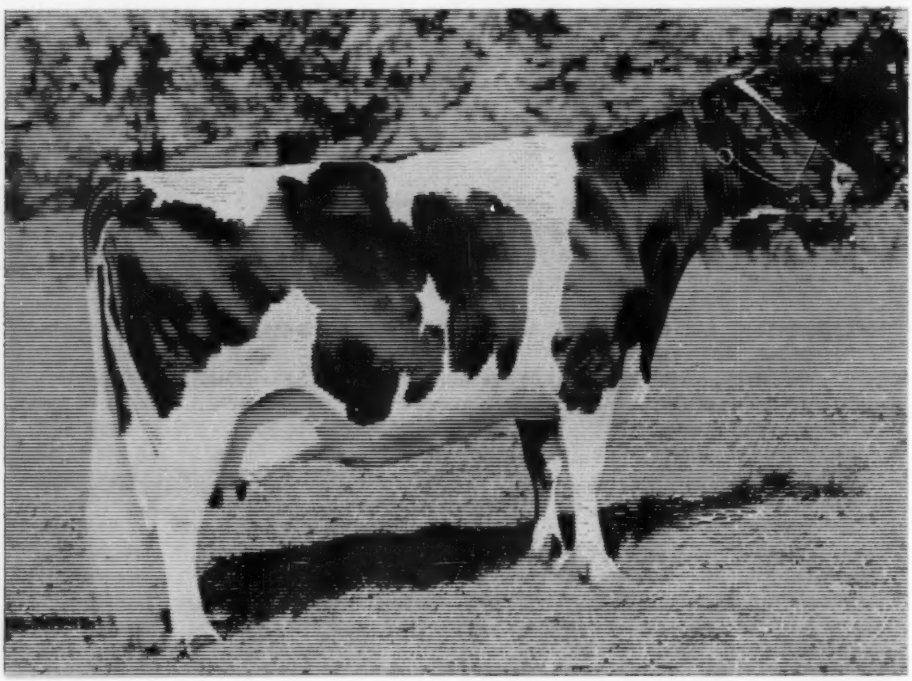

Holstein—Ancestors of the Holstein roamed the grassy lowlands of Holland and Northern Europe at the time of Christ. They arrived in the New World with the early Dutch settlements. As a result of purebred importation in the 1860's, registry began in 1872. Famous for milk production, the Holstein breed today is one of the most popular of the nation's dairy herds.

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Non-irritating, non-allergenic, non-anaphylactic. No residue. No hair discoloration. Completely safe.

'SEBUMSOL' complements . . . does not complicate any additional therapy which may be required.

□□□without anesthetics or instruments

INDICATIONS:

(1) **Removes excess or impacted earwax.**

(2) **As a pre-treatment. Removes "cerumen barrier." Enhances effectiveness of any additional therapeutic measures.**

(3) **Cleans the ears; facilitates aural examination and diagnosis.**

(4) **Relieves otitis externa, itching and pain, due to excessive cerumen.**

SUPPLY: 'SEBUMSOL' is available in 1 fl. oz. dropper bottles with dispensing label; also pint bottles for hospital use. **Low priced for routine use.**

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Write for samples and literature.

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Kymar exerts a powerful systemic anti-inflammatory action to promote faster healing. Absorption of edema and blood extravasates is accelerated with relief of pain and restoration of impaired local circulation. Indicated wherever inflammatory tissue reactions retard healing as in: lacerations; contusions, fractures; surgical trauma such as mammary tumor excision, open reduction of fractures, abdominal surgery; cellulitis; abscesses; inflammatory eye conditions. Supplied in vials of 5 cc., oil or aqueous.

ESTABLISHES A VIGOROUS HEALING CLIMATE

KYMAR® OINTMENT

Cleans the wound, clears infection, controls inflammation

Combines debriding, anti-inflammatory, and bacteriostatic effects. The contained proteolytic enzymes cleanse the area of necrotic tissue or crust; anti-inflammatory steroid action controls local edema, hyperemia and pruritus; while local infection is controlled by direct antibiotic action. Kymar Ointment promotes more rapid healing of infected surgical sites, cuts and abrasions, abscesses, fistulous tracts, open joint capsules, burns, primary pyogenic dermatitis (hot spot), skin necrosis (cast sores), mammary gland abscesses. It also minimizes exuberant granulation tissue (proud flesh) in wounds of accidental or surgical origin, and of scar tissue in areas of cosmetic importance. Each gram contains: hydrocortisone diethylaminoacetate hydrochloride 1.25 mg., neomycin palmitate (as base) 3.5 mg., proteolytic activity* 10,000 Armour Units; in a water miscible base.

**as provided by a concentrate of pancreatic proteases*

SOLD ONLY TO LICENSED VETERINARIANS

ARMOUR

VETERINARY DEPARTMENT
ARMOUR PHARMACEUTICAL COMPANY
KANKAKEE, ILLINOIS

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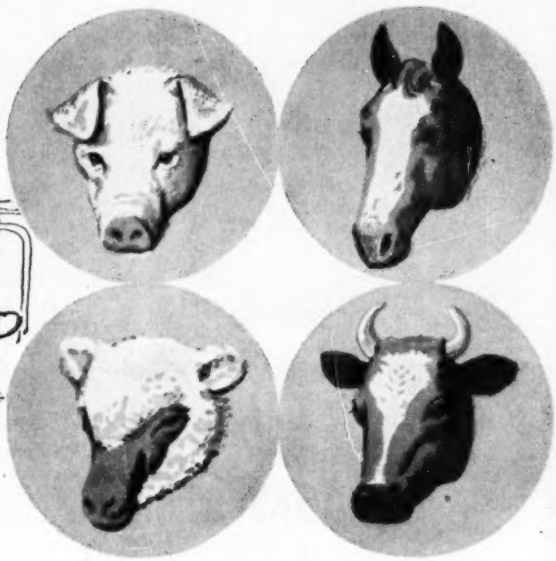

P.O.P. causes powerful rhythmic contractions of uterine muscle and thus accelerates parturition, eases slow delivery due to uterine inertia, and assists postpartum evacuation of placenta. P.O.P. also exerts a profound contracting effect on smooth muscle elements of the mammary gland to stimulate let-down of milk. In the management of mastitis, it clears inflamed milk ducts to assist udder evacuation.

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news from Washington . . .

FROM THE AVMA WASHINGTON OFFICE
J. A. McCallam, VMD
Brig. Gen. USA (Ret.)

Minimum Milk and Butterfat Prices Set

Public Law 86-799 (S. 2917), further amends the Agricultural Act of 1949, establishing price of milk for manufacturing purposes and the price of butterfat at not less than $3.22 per hundredweight and 59.6¢ per pound, respectively. It became effective Sept. 16, when approved by the President, and ends March 31, 1961.

NIH Gives Research Grants

National Institutes of Health awarded more than $229,500,000 in grants for research, for fiscal year ending June 30, 1960. Of this amount, $198,717,397 in grants to support 11,572 medical research projects, and $30,786,106 in awards for construction, expansion, and equipment of over 100 health research facilities. Information dealing with research fellowships, training grants, and traineeships for same period will soon be available.

PHS Takes Over Medical Supplies

Effective October 1, PHS took over from the Office of Civil and Defense Mobilization $200,000,000 worth of stockpiled medical supplies and equipment. PHS had authority pertaining to medical defense manpower and physical facilities but not essential materials.

"Life Sciences and Space" Report Available

House Committee on Science and Astronautics has published a 21-page report titled "Life Sciences and Space." It is a staff analysis and summary of testimony presented to the committee by civilian and military administrators. Copy may be obtained free by writing to the committee cited above, U.S. Capitol Bldg., Washington 25, D.C.

FDA Veterinary Branch Moves

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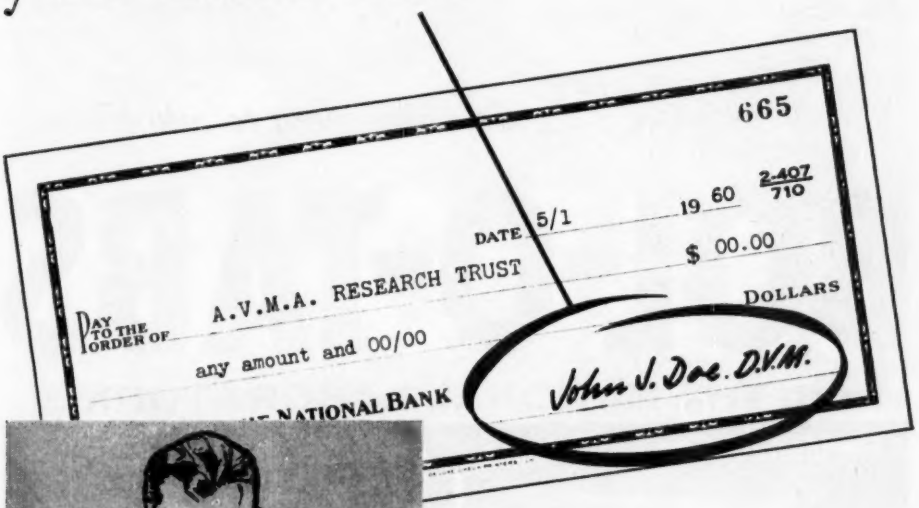

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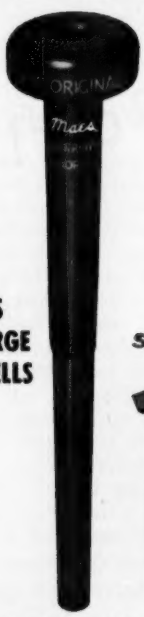

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Live Virus Immunizing Agents

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IMMUNIZATION against viral diseases is one of the most important considerations of modern medicine. Reasons for its importance include: (1) the contagiousness and fatality rate of many virus diseases, (2) the lack of chemotherapeutic agents for these infections, (3) the fact that some viruses play causal roles in neoplastic disease, and (4) the economic significance of some animal plagues caused by viruses.

No discussion of preventive medicine is complete today without some consideration of virus immunization. In human and comparative medicine, some of the specific virus diseases of major importance are canine distemper, rabies, poliomyelitis and other enteroviruses, infectious canine hepatitis, hog cholera, measles, human upper respiratory disease, infectious bovine rhinotracheitis, bovine virus diarrhea and related agents, and transmissible gastroenteritis of swine. This group includes most of the diseases for which live virus vaccines have been developed or proposed, and thus provides the bases for this paper.

The scientific activity associated with this subject has particular incidental interest because it demonstrates how prejudice in medical research can result from the avoidance of sound biological principles. It has been stated that "It is sometimes said that the future of live poliovirus vaccines is assured by the success of live virus vaccines in veterinary medicine."[14] These authors state that the criteria used for evaluation of veterinary vaccines are not satisfactory for determining the validity of preparations for man. If one of the bases for the use of live virus vaccines in human immunization is the observation of such practices in veterinary medicine, then it becomes particularly pertinent that the application of such products to animal disease immunization be reviewed and evaluated critically.

The purpose of this paper is to: (1) briefly review the history of live virus vaccine development, (2) indicate the criteria for a satisfactory live virus vaccine, (3) discuss methods for selecting virus strains for vaccines, and (4) discuss some methods for evaluating and controlling live virus vaccines.

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History of Live Virus Immunization

The first record of the use of live viruses for protection against disease is lost in antiquity, but probably was the Chinese system of using crusts of smallpox lesions to protect their children. Animal diseases for which fully virulent virus has been used for immunization include hog cholera and canine distemper. The essential defect of such vaccines is best illustrated by hog cholera, in which the fully infective immunizing virus is widely distributed in the environment and, not infrequently, is directly responsible for epizootics of disease.

The first use of an avirulent relative of a highly infectious virus for purposes of immunization was recorded as Jenner's classical work with cowpox virus. Subsequently, a similar cross-protection was demonstrated with a laboratory-derived variant; vac-

cinia virus, the agent currently in use for protection against smallpox. Smallpox immunization has been practiced on a world-wide basis for many years, and has been highly successful in many parts of the world although it has not resulted in eradication of the disease.

A modern example of human immunization by a live virus vaccine is the development in tissue culture of the 17-D strain of yellow fever virus. This strain is relatively nonpathogenic for man, produces satisfactory immunity, and has been proved useful in the field.

A new program of hog cholera immunization involving the use of attenuated live virus was initiated in recent years.[4, 35] Several methods of virus propagation have been used, resulting in varying degrees of attenuation. The statement has been made that ". . . the vaccine virus combines the immunogenic properties of a living virus and the safety of a killed virus vaccine and is, in fact, nonvirulent."[43] Supporting experimental evidence does not entirely justify such a statement.

The ferret-adapted virus for distemper immunization[23] was the first attempt at using live virus for prophylaxis against this disease. Other vaccines were developed following the adaptation of Green's distemperoid strain to the developing chicken embryo,[24] and the subsequent use of similarly adapted virus.[10,31] More recently, 2 reports concerning the use of tissue-cultured virus for vaccine preparation have appeared.[45, 46] An editorial comment accompanying these states, "It could well signal a breakthrough that could supply missing answers to the perplexing canine distemper problem." Such a statement may be misleading, since no real biological advantage is offered by simply changing the substrate for virus propagation, and certainly no basic problem associated with live virus vaccine immunity will be resolved by this simple manipulative change. Moreover, developments[12, 40] in this area have been known for several years, although reference to this work was omitted.

Modified live virus vaccines for infectious canine hepatitis are currently in use following tissue culture adaptation of the virus.[13, 17, 20]

Rinderpest has not been of importance in the United States. During World War II, however, rinderpest research[25, 26, 30] was done on this continent and a live virus vaccine developed. Fortunately, it has never been considered necessary to protect animals against rinderpest in this country.

Success with live virus vaccines for canine distemper and rinderpest suggests that a similar immunizing product could be used against the closely related agent, measles. Work[18] is being done by several groups toward developing such a vaccine. It is necessary to question whether a measles vaccine, either killed or live, is advisable for general use since the immunity produced in children may not be permanent, and consequently a greater number of susceptible young adults, the age group in which postmeasles encephalitis is relatively common, may result.

The isolation of the Flury strain of rabies and its subsequent adaptation to the chicken embryo[33, 34] resulted in the development of an attenuated strain of virus. High egg passage rabies virus has been suggested as a routine immunizing agent for man, and has been tried in several instances.[3, 21]

Although the antigenicity of such a vaccine is not questioned, the advisability of using a live virus that is derived from an agent of the virulence capacity of rabies in any species is doubtful. Further, more recent developments[44] in the use of inactivated vaccines of avian origin indicate that there may be no real need for the use of living vaccines for rabies prophylaxis in most situations.

Infectious bovine rhinotracheitis is recognized as an important disease of cattle in the United States. The present method of immunization is by intramuscular injection of live virus vaccine modified by serial passage in tissue culture.[21, 22] This vaccine was introduced through commercial channels within a relatively short time after the initial description of the disease and with a minimum of critical evaluation.

Undoubtedly, the greatest amount of discussion, criticism, and evaluation of live virus vaccine has been associated with the proposal to use such a product for protection against poliomyelitis. This subject has produced one of the stormiest controversies in modern medicine, as well as the most extensive field and laboratory testing and evaluation of any vaccine.[9, 29, 32, 42, 47, 48, 50] The final word on its official acceptance in the United States has only recently been given.

Criteria for a Live Virus Vaccine

Some of the practical requirements and purposes of live virus vaccines deserve consideration.

Live virus vaccines must have the capacity to stimulate a protective antibody response. In most cases, this is a result of a limited subclinical infection, and thus the material must contain sufficient virus to invade the host's cells. From a practical standpoint, this factor may be a problem for unstable viruses, as discussed later in regard to canine distemper vaccine. Also of considerable importance is whether or not the invasion of host cells by vaccine virus can be blocked or interfered with by another "wild" virus. It has been shown, for example, that certain enteroviruses other than that of poliomyelitis may interfere with the ability of the latter to invade susceptible cells and produce immunity.[5]

Long duration of immunity is an advantage sought with live virus vaccines. Since protection is derived as a result of cellular infection, it might be presumed that the immune response simulates that following natural infection. That this assumption may

not be entirely valid is shown in the case of distemper vaccine in which annual revaccination may be a requirement for maintaining maximum protection. In the case of canine rabies live virus vaccine, however, there is a longer protection than is possible with phenolized products. Another problem of practical importance in regard to the duration of antibody response is the danger that a certain level of neutralizing antibody may neutralize subsequent doses of vaccine virus.

Alterations in virus pathogenicity are probably the result of mutation. It is essential that the avirulent mutants are stable before they can be considered as satisfactory for vaccine use. Further, if the virus is excreted after vaccination, there must be assurance that either single passage or subsequent passage to other animals is not associated with reversion to virulence. These factors have not been thoroughly investigated for most veterinary vaccines. The question of instability of vaccine strains was brought into sharp focus by the demonstration of increased poliovirus neurovirulence in vaccine virus excreted by vaccinated children.[40] Others[56] have indicated that serial passage of vaccine virus does not result in progressive return to original virulence. The problem of reversion of this and other vaccine viruses is not resolved.

In other studies[15,16,29,36-39,61] on poliovirus variants, it has been shown that relatively minor alterations in temperature, cell substrate, and chemical environment may affect the virulence of the organism. One then may question logically the stability of induced or naturally occurring variants of this and other viruses when exposed to the stresses of normal or abnormal environment during the uncontrolled course of the virus following its introduction to the host animal. It is true, of course, that such problems are limited when the vaccinated host is "dead-end" and does not excrete live virus.

Another criterion of efficiency of live virus vaccines concerns their capacity to prevent subclinical propagation of wild strains of virus in the host. In some cases immunization with killed vaccines, while preventing clinical disease, may not render all tissues immune to viral invasion.[59] Thus, the immunized individual may serve to insidiously harbor and propagate active virus, allowing survival of the pathogen within the animal community. Most veterinary live virus vaccines have not been investigated thoroughly to determine the role they play in completely blocking subsequent virus invasion by various routes.

Safety is a principal factor in regard to live virus vaccines. Interpretation of safety can be made only when several factors are considered. First, the individual given the vaccine must not develop clinical disease. In most cases, live virus vaccines do not produce signs of frank clinical disease, although some suggestion has been made that canine distemper vaccine virus may, on occasion, be pathogenic.[29] More important, regarding safety, is the capacity of the vaccine virus to spread to susceptible animals, with concurrent return to virulence.

Live virus vaccines are not the ultimate in virus disease prevention by prophylactic means.

This factor is usually examined by placing susceptible animals in contact with vaccinated individuals. More elaborate techniques usually are not employed in examing veterinary virus vaccines. It is conceivable, for example, that virus in some cases may be distributed only from a relatively few vaccinated animals. Further, several passages of virus may be required for reversion to a point that clinical or antibody responses take place. In any case, safety tests of these vaccines have been extremely limited.

In summary, the following criteria for live virus vaccines must be considered: (1) ability to produce immunity, (2) long duration of immunity, (3) lack of reversion to pathogenicity of vaccine strains, (4) ability to "block" propagation of field strains in the vaccinated host, (5) inability to produce clinical disease, and (6) inability of vac-

cine virus to spread to, and cause disease in, contact nonvaccinated animals.

Derivation of Strains for Live Virus Vaccines

The methods of attenuation of viruses for vaccines were reviewed recently.[57] As in any group of living entities, mutations occur which result in strains that have different or altered characteristics. In the case of viruses for vaccine use, a mutation that results in decreased pathogenicity but unaltered or enhanced antigenicity is ideal. Attenuated strains may occur naturally, occur following introduction to unusual hosts, or develop as a result of alteration of environmental conditions.

In nature, as in the laboratory, mutations are occurring constantly. Thus, one method of obtaining a desired virus strain is by direct isolation of an altered virus from a host. A certain amount of direction can be associated with such techniques, such as selecting an individual host that has only a mild case of disease, or examining clinically normal animals that may be harboring the virus.

Transfer of a virulent virus to an unusual host is another method of inducing changes to relative avirulence for the natural host. The hog cholera virus was adapted in such a manner by intermittent passage in the rabbit;[35] distemper and rabies viruses, in the chicken embryo.[10,11,33] More recently, viruses have been shown to develop avirulent mutants during serial passage in tissue culture.[44,46]

Finally, altering the environmental conditions in which the virus propagates may serve as an inducement to mutation. Temperature and chemical changes have been effective in causing changes in the characteristics of the agent.[19,29,36,37]

The relationship of stability of mutants to the ease in which they are obtained is not known, but raises several theoretical problems. It might be thought that changes in virus virulence following relatively minor environmental adjustments produce less stable variants than a series of long and more complex passages. On the other hand, naturally occurring variants are, perhaps, the most stable since exposure to an environment conducive to propagation of virulent relatives has not prevented the survival of mutated strains. It is interesting to note that several currently used animal live virus vaccines (*i.e.*, infectious canine hepatitis; infectious bovine rhinotracheitis) have had relatively little manipulation from original virulent isolate to point of incorporation into an immunizing product.

Some Additional Considerations

The reservoir problem with viruses frequently escapes consideration in discussing live virus vaccines. For example, the part that vectors may play in the propagation and alteration of vaccine viruses of hog cholera is unknown; however, that such vectors (lungworms) are important in the natural cycle of the disease has been demonstrated.[53,54] Measles virus has been shown to propagate in the dog, causing only subclinical infection.[58] If a measles live virus vaccine were in use for immunization of man, it becomes conceivable that such virus strains may be maintained and subsequently altered in the domestic dog. A somewhat similar problem may develop for the dog if live distemper vaccine should be used for the protection of man against measles.[2]

Stability of Canine Distemper Live Virus Vaccines

Since resistance of various viruses to environmental conditions differs, each live virus vaccine presents a separate problem. In this sense, stability refers to preservation of viability rather than inability to revert or change upon multiplication. In some respects, distemper virus is extremely labile, particularly when exposed to air and moisture. Further, since live virus distemper vaccine depends on subsequent virus multiplication in the host for the production of adequate immunity, an initial infecting dose is essential. The required level for adequate immunization is generally accepted as a minimum of 1,000 chicken embryo infective doses. The results of the examination of 6 market samples of vaccine for virus content are given (table 1). Half the samples were inadequate for the pro-

TABLE 1—Tests of Viability of Live Virus Canine Distemper Vaccines

Manufacturer	Satisfactory titer	Time to expiration (months)
1	No	7
1	No	1
2	Yes	11
2	Yes	9
3	No	10
4	Yes	9

duction of immunity. It is startling to note that 2 of these vaccines had 7 and 10 months remaining until their expiration dates. Since these materials were obtained from normal commercial channels, and handled in a manner that even favored the preservation of viability, there is little reason to assume that these results were unusual; however, the small number of samples do not permit drawing a final conclusion.

It is possible that a large proportion of animals that have been given commercial live virus canine distemper vaccines have actually not been immunized. The cost to the practitioner and the client, and the loss of animal life through the parenteral administration of ineffective vaccines may be high.

Federal Control Regulations for Live Virus Vaccines

Extensive control regulations for proposed live virus polio vaccines have been formulated by the U. S. Public Health Service. As is usual with human biological products, these measures are designed to adequately assure safety and potency of the product as determined by tests conducted both by the manufacturers and by the National Institutes of Health.

In contrast, the regulations formulated by the Agricultural Research Service (ARS) for controlling veterinary biological products are a study in inadequacy. In the minimum requirements for canine distemper vaccine, modified live virus, published by the ARS on Sept. 3, 1957,[27] the following statement is made: "Sterility tests are not required, but the final product is tested in mice and guinea pigs or rabbits to detect the presence of pathogenic organisms." In other words, unless an organism of the type or number that is sufficient to cause infection in laboratory animals in 7 days is present, the final product is permitted to contain contaminants.

In the same publication, the required potency test is outlined. It consists of inoculating 2 or more dogs (or ferrets) with the vaccine in question and retaining 2 animals as controls. At the end of 14 days, the immunity of the dogs is challenged with virus. The test is satisfactory if the vaccinated dogs remain well and all, or 2 of 3, control animals have "typical symptoms" of distemper. The total observation period is 21 days.

Aside from an entirely insignificant number of animals used in such a test, no provision is required for: (1) determining the antibody level of animals before immunization, (2) allowing for a longer incubation period in individual animals, (3) tests to determine the actual virus content of the vaccine, (4) determining the potency of the challenge virus, and (5) determining stability of the product.

In regulations covering rabies vaccine, modified live virus, "sterility tests are not required." In determining safety, only 2 dogs are required to be given injections intramuscularly. The observation period is 21 days, a time limit that is open to question.

Generally, the ARS minimum requirements make no allowances for control of production methods or procedures. Similar inadequacies exist in the control of bacterial and killed virus biological products. Essentially, there is little assurance offered to the final consumer of veterinary biological products regarding safety and efficacy based on enforced federal controls.

Stability of vaccine is an important factor in all vaccines, but is most important in canine distemper live virus products, as discussed above. More nearly adequate regulations to examine such products for viability seem to be in order. Furthermore, after a live virus vaccine for infectious bovine rhinotracheitis had been introduced to the market, no standard requirement for processing and testing such a product had yet been published.

Suggestions for Testing and Evaluating Live Virus Vaccines

An attempt has been made to outline standards for live virus vaccine.[45] For the most part, the proposed standards are inadequate for either safety or potency, are minimal, and offer little security for the purchaser.

It is proposed, therefore, that the following points be considered when determining whether a living virus vaccine is acceptable for introduction into commercial channels:

1) Live virus vaccines should be considered for general use only when there is a definite and specific need to be determined by 2 essential factors: (*a*) a real and basic need exists for an immunizing agent for the disease in question, and (*b*) it is ascertained unquestionably that inactivated vaccines are unable to produce satisfactory immunization.

2) No vaccine should be accepted until extensive and exhaustive field trials are conducted, with thorough and detailed review by regulatory agencies. It is inconceivable that satisfactory information could be gathered in less than several years.

3) Detailed data must be presented in regard to the various basic aspects of each virus vaccine, including studies on interference from other viruses, stability, duration of protection, virus excretion by all routes, and whether carrier status can exist after immunization.

4) Each lot of vaccine produced must be released on the basis of adequate potency tests and not merely by virus content. Further, each lot should have retests during its market life. It is essential also that reference vaccines be used in each test.

5) Each lot of vaccine produced must have adequate laboratory safety tests, to be designed in detail for each vaccine. Single back-passage of the virus may not be adequate for determining safety from the standpoint of reversion to virulence.

6) Serologic tests should be used for supplementary data but not as a substitute for potency tests.

7) Tests done by the manufacturer should be duplicated by the regulatory agency before any lot of vaccine is released for sale.

8) An active system of surveillance for each disease in relation to the specific live virus vaccine should continue, and re-evaluation of the vaccine made on an annual basis at least.

9) All current testing systems for each live virus vaccine should be publicized in order to allow a greater degree of confidence to the consumer.

10) Approval for new vaccines, changes in process, and testing methods should be given by the regulatory agency only after considering the opinion of a qualified advisory committee. Such a committee should consist of at least 8 nongovernmental and noncommercially employed scientists. Such a committee should meet with and review all proposals by the various manufacturers.

Conclusions

Live virus vaccines should have an important place in the prevention of disease. It is apparent, however, that many factors concerning their use, at least in animal medicine, have been minimized or disregarded. The control of manufacture, testing, and stability of such vaccines frequently has been lax and inadequate. Much more stringent examinations must be made of their real value, especially by means of extensive controlled field trials, of their stability as nonpathogenic strains, and of methods employed to assure quality of products.

Live virus vaccines are not the ultimate in virus disease prevention by prophylactic means. Rather, they are intermediates in reaching a more nearly ideal system of prevention, either by complete eradication or adequate protection by the use of inactivated immunizing agents.

Biological systems have progressiveness as one outstanding characteristic. They are dynamic and responsive to conditions about them. When offering altered living systems into nature's complex environment, one must consider a basic question: Do the live virus vaccines offer a method for the eventual eradication of the pathogenic agents involved? Or is our heritage to succeeding generations the establishment of new living entities that, with passing time, will develop diverse mutants of enhanced pathogenicity, making even more difficult the protection of the species we are striving to preserve?

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African Tick, Carrier of Animal Diseases, in Florida

The red tick (*Rhipicephalus evertsi*), carrier of several exotic animal diseases—including East Coast fever, has been found in Florida. This is the first time that this tick, common to Africa and a known carrier of Texas cattle fever, has been identified in North America.

Officials in charge of state-federal livestock disease eradication programs in Florida said the ticks were found by an inspector checking animals in the 160-acre animal compound of "Africa, U.S.A.," at Boca Raton.

Discovery of these African ticks in the United States poses a new problem in tick eradication because of the ticks' ability to survive on the ground more than a year. This is a 2-host parasite and can be carried by a second host animal after it has dropped from the first.

The Texas cattle fever tick (*Boophilus microplus*), at which the present tick eradication program in Florida is aimed, feeds and grows on a single animal and then drops to the ground to lay eggs.

Work is now underway to inspect every head of cattle, horses, and mules (about 1.3 million animals) in 32 Florida counties lying south of the state quarantine line.—*USDA News Release, Oct. 4, 1960.*

Methocarbamol in the Control of Severe

Skeletal Muscle Spasms

in Small Animals

E. ESTRADA, D.V.M.

SEVERE MUSCLE SPASMS occurring in small animals require prompt administration of a rapid-acting skeletal muscle relaxant to save the patient's life. Controlling the spasms is the first measure to consider, and often the only one necessary, in treatment of some forms of poisoning by ingestion of chemicals used to kill rodents, insects, or weeds, as well as in treatment of tetanus and puerperal tetany.

Until recently, pentobarbital sodium has been widely used to control skeletal muscle spasms, although frequently the spasms are not controlled until enough medication is given to anesthetize the patient. The risk in this procedure is significant in older patients and those suffering from organic disease.

During 13 months, methocarbamol* was used in our practice to control skeletal muscle spasms in small animals. This drug has a depressant action on the multisynaptic reflexes, but does not impair normal reflexes.

It has been shown experimentally that its protective action against strychnine-induced convulsions is longer than that of mephenesin.[2] It also has a more potent inhibiting action against metrazol-induced convulsions than mephenesin. When given over prolonged periods in doses several times those required for therapeutic effects, methocarbamol caused no significant alterations in hemograms or organ functions of experimental animals.

For rapid effect, methocarbamol may be given intravenously or intramuscularly. Dosage depends on the severity of spasms and, in our study, ranged from 0.17 to 1.43 cc. (17 to 143 mg.) of methocarbamol per pound of body weight. Side effects such as salivation, temporary ataxia, or vomiting may occur following rapid administration. If methocarbamol is given at a slow rate (approximately 1 cc./minute) it is usually possible to gauge the exact dose required to control muscle spasms without the occurrence of side effects.

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*Robaxin, A. H. Robins Company, Inc., Richmond, Va.

Clinical Uses

At least one other published report on the clinical use of methocarbamol in animals is known and concerns its use in the treatment of equine tetanus.[1] Its depressant action on reflex skeletal muscle spasm suggested its possible application to various conditions in small animals, some of which are here described.

Poisoning by Strychnine.—Six dogs with clinical signs of strychnine poisoning were treated exclusively with methocarbamol; 3 were in a state of uninterrupted convulsions when treated, 2 went into convulsions only as a result of stimuli, and 1 was treated immediately after ingestion of strychnine. All dogs recovered completely after intravenous therapy with methocarbamol.

A large dose of methocarbamol (1.43 cc./lb. of body weight) was administered to a 14-lb. male dog of mixed breeding because he was known to have ingested 1/15 gr. of strychnine. Since the owner could not induce vomiting immediately after the ingestion, he rushed the dog to the hospital. Spasms developed rapidly when the dog was placed on the examination table and, within a few minutes, became severe.

An initial dose of 10 cc. of injectable methocarbamol (1.0 Gm. of active agent)

TABLE 1—Effect of Methocarbamol on Animals with Muscle Spasms

Cause of spasms	Patient	Wt. (lb.)	Dosage (cc.)	*cc./lb. of body weight
Strychnine	Boxer	55	20.0	0.36
	Boxer	48	10.0	0.21
	Dalmatian	35	10.0	0.28
	Dog of mixed breeding	8	7.0	0.87
	Dog of mixed breeding	14	20.0	1.43
	Cat	8½	5.0	0.60
Chlordane	Dog of mixed breeding	28	10.0	0.35
Puerperal tetany	Boston Terrier	14	4.0	0.29
Undetermined	Boxer	60	10.0	0.17
	Siamese cat	7	5.0	0.71
	Collie	60	10.0	0.17
	Dog of mixed breeding	20	6.0	0.30
	Robin	—	0.5	—

*1 cc. contains 100 mg. of methocarbamol.

was given intravenously at a rapid rate. Although the muscle spasms decreased, they were initiated by the slightest stimulus. An additional dose of 10 cc. was given by the same route, at which time even patting the dog or tapping the table failed to evoke spasms. After the injections, there was profuse salivation, lasting about 10 minutes. Relaxation was so complete that the dog was barely able to hold up his head. This state of ataxia did not disappear until 2 hours later, after which recovery was rapid and clinical signs did not recur.

Poisoning by Chlordane.—On the basis of history and clinical signs, the following report is assumed to have been one of chlordane poisoning.

A preparation containing chlordane had been sprinkled on the owner's lawn, and the next afternoon it rained for about 2 hours. That evening, the dog took a bone to the lawn to eat and about an hour later was put in the cellar for the night. The following morning, the dog staggered when he tried to walk; his body, head, and jaws trembled violently; and saliva drooled from his mouth. His condition was unchanged when he was brought to the hospital. The senses were not impaired, and there was no hyperesthesia or hypersensitivity to stimuli. This dog was a 28-lb., 4-year-old male of mixed breeding.

An initial dose of 4 cc. (400 mg.) of methocarbamol intravenously diminished the severity of the tremors and permitted the dog to walk normally and jump. Since the tremors did not subside completely within half an hour, an additional 6 cc. (600 mg.) was administered by the same route. This treatment afforded complete relief for 1 hour and 20 minutes, at which time the tremors reappeared. Four hours after the initial dose, the tremors were almost as severe as before; 10 cc. of methocarbamol and 25 mg. of chlorpromazine were then administered intravenously. Almost immediately afterward, 10 cc. of a 10 per cent solution of calcium gluconate was given. Although the dog was still normal an hour later, it was given 1.5 Gm. of methocarbamol and 25 mg. of chlorpromazine orally. This treatment was repeated 5 hours later, although there were still no signs of recurrence. Drug treatment was discontinued and the dog was discharged the following day, apparently normal.

Puerperal Tetany.—When puerperal tetany does not respond to calcium therapy alone, it may become necessary to administer pentobarbital sodium, often to the point of inducing general anesthesia. With this fact in mind, it was decided to administer methocarbamol prior to calcium gluconate in a dog with puerperal tetany in order to determine whether this type of convulsion was amenable to treatment with methocarbamol.

A female Boston Terrier, 18 months old and weighing 14 lb., developed puerperal tetany in the third week after whelping. During gestation, she had been given daily 1/5 gr. each of desiccated thyroid, parathyroid, and thymus preparations, 5 gr. of calcium gluconate, and vitamin and mineral supplement. At parturition, she had been given calcium gluconate, i.v.

Methocarbamol was administered intravenously at a slow rate, and by the time 4 cc. was injected, muscle spasms completely subsided and she tried to get up. Through the same needle, 10 cc. of a 10 per cent solution of calcium gluconate was given as specific treatment for puerperal tetany. Recovery was satisfactory, but a slight ataxia persisted in the hindquarters which was visible when the dog walked.

Muscle Spasms of Undetermined Origin.—The following 5 cases are representative of the kind of condition in which the only clinical sign is skeletal muscle spasm, and the onset is usually sudden. These patients were treated symptomatically with methocarbamol.

Case 1.—A male Boxer, 2 years old and weighing 60 lb., was brought to the hospital with moderate tonic spasms of the gluteal muscles which had persisted without interruption for 3 days. On examination, the dog was normal except that he walked with a slightly stilted gait.

Methocarbamol (10 cc.) was given intravenously at a slow rate, and by the time the injection was completed, the spasms had disappeared and walking posture was normal. There was no recurrence of the spasms.

Case 2.—A spayed female Siamese cat, 4 years old and weighing 7 lb., was found apparently dead. Upon closer examination, shallow breathing was detected. Two hours earlier, the cat had seemed normal.

When the cat was brought to the hospital, her front legs were extended rigidly and her eyes were glassy and staring. Her respiration was slow and shallow, and her body temperature was 101 F. Although there were no visible muscle spasms, the jaws could not be opened nor could the forelegs be flexed.

Intravenous injection of methocarbamol was begun, and by the time 5 cc. had been given, the cat took a deep breath and the muscular tension was relieved. Her mouth was opened easily and her legs were flexed without resistance. Recovery was slow but, since there was no indication of rigidity, no further treatment was given. That evening, the cat changed position in her cage, and the following morning she appeared normal.

Three months later, the owner called to report that the condition had recurred; however, the cat was not brought to the hospital, and a few days later she died.

Case 3.—A 60-lb. spayed female Collie refused to rise when called, and when forced to walk, kept her hindlegs together and hopped like a rabbit. The abdominal and gluteal muscles were tense and hard on palpation. There was no evidence of localized pain. The condition had persisted over 12 hours. Methocarbamol (10 cc.) was injected intravenously, and the dog was placed in a cage after administration of a mild laxative. An hour later, the dog jumped and walked normally. The abdominal and leg muscles appeared to have normal tone, and clinical signs did not recur.

Case 4.—This dog, a 4-year-old spayed female weighing about 20 lb., was first seen in convulsions which lasted more than an hour. Methocarbamol was administered intravenously at a slow rate. Convulsions ceased by the time 6 cc. had been given and the dog walked normally when placed on the floor. Senses and reflexes were normal; 2 months later, there had been no recurrence.

Case 5.—A pet robin was presented for examination with severe muscle spasms suggestive of strychnine poisoning, except that they were not altered by stimuli. The legs were held stiffly in extension. Methocarbamol (0.5 cc.), injected into the breast muscles, produced relaxation in a few minutes. Two hours later, some animation became apparent. Several hours afterward, the bird appeared normal and remained so for 4 months when the condition recurred. This time, the bird was not treated and it died.

Distemper Chorea.—Twelve cases of chorea in dogs involving one or more groups of muscles and ranging from mild to severe were treated with methocarbamol by both intravenous and oral routes. Muscle spasms were completely controlled for an average of 1 hour, and as long as 6 hours in 1 dog. Due to the relatively short duration of the drug's effectiveness in these cases, its use to control distemper chorea was not considered successful. Methocarbamol given orally could be of some value in mild cases.

Discussion

The potent antispasmodic action of methocarbamol makes it a useful drug in veterinary practice for treating skeletal muscle spasms. When the life of the patient may depend on controlling these spasms, it is considered at least as effective as pentobarbital sodium, and much safer. Since results of treatment can be gauged almost immediately, and since the patient remains ambulatory, methocarbamol is less hazardous than pentobarbital sodium.

It would appear that the severity of the spasm, rather than the size or weight of the patient, governs the dose of methocarbamol required to control the convulsions. All the animals treated for strychnine poisoning recovered sufficiently to permit discharge within half an hour after treatment, except for a dog that developed ataxia. This ataxia was probably due to the high dosage employed and the rapid rate of administration of the drug. Within 2½

hours, however, this dog appeared normal.

Tolerance to the drug is excellent and even massive doses such as were given to the robin (the amount given is estimated to range between 300 and 400 mg./lb.) did not produce death or permanent injury. Since no incompatibility exists between methocarbamol and ataraxics of the phenothiazine group, pentobarbital sodium, or calcium, these drugs may be used simultaneously.

Summary

Of 25 animals treated with methocarbamol, 6 involved strychnine poisoning; 1, chlordane poisoning; 12, distemper chorea; 1, puerperal tetany; and 5, conditions of undetermined origin. Spasms were completely controlled within a few minutes and all patients, except those with distemper, recovered completely.

Although the spasms of distemper chorea were controlled, the drug's relatively short duration of effectiveness limits its value in this condition.

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Spirocerca Cyst Causes Systemic Disease in a Dog

A 3-year-old dog had fever, dry cough, dyspnea, anorexia, sialorrhea, priapism, slow pulse, pale mucous membranes, dullness, and enlarged and painful lymph nodes. Routine tests were inconclusive. At necropsy, the lymph nodes were found to be enlarged and the medulla was hyperemic. In the mediastinum, intimately connected with the esophagus and the esophageal nerve, there was a cyst the size of a pigeon's egg, containing *Spirocerca sanguinolenta.—Vet. Bull., 30, (June, 1960): 332; abstr. from Acta med. vet., Napoli, 5, (1959): 211.*

Sialoliths in a Dog

On necropsy of a dog, 2,300 calculi weighing 1.98 Gm. were found in a dilated submandibular salivary gland duct. Part of these calculi were embedded in the duct wall and part were connected with it by means of a peduncle. Part were lying free in the cyst formed by the dilated duct.

It appears that calculi in salivary gland ducts result from proliferation centers in the duct walls. Proliferation may be caused by frequent mechanical stimulation acting on the submaxillary salivary gland ducts in the dog.—*Med. Wtryn., 16, (May, 1960): 279.*

Spray Treatment of Calves with Bayer 21/199 for

Control of Cattle Grubs and Lice

in Montana

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ALTHOUGH Bayer 21/199 (0-(3-chloro-4-methylumbelliferone) 0, 0-diethyl phosphorothioate),* when administered by mouth at a dosage level of 25 mg./kg. of body weight, was ineffective in killing the larvae of the cattle grub, Hypoderma,[11] a 100 per cent kill of larvae was observed when cattle were scrubbed with a 1 per cent suspension of the insecticide.[17] Bayer 21/199 was found to act not only against grubs which had penetrated the skin, but also against those larvae which were in earlier stages.[2] The insecticide was evidently acting systemically.

The purpose of this report is to present data gathered in Montana in 2 experiments in 1957 and in 1958 and to give a brief summary of the available technical papers describing use of Bayer 21/199 in killing the larvae of Hypoderma sp. within the host.

Materials and Methods

Two groups of weaned Hereford steer calves were purchased from a single ranch in Sweet Grass County, Montana, and delivered to the Huidekoper Veterinary Research Station, Big Timber, Mont., during November, 1957, and November, 1958. The calves were 6 to 7 months old when received. Two to 3 weeks after delivery, the calves were branded, ear-tagged, and individually weighed. During the course of the experiments, the calves were housed in corrals and fed grass hay. Some calves were given a high salt-protein supplement 6 weeks or 2 months after having been treated with Bayer 21/199.

In the 1957 test, 74 calves were allotted to 2 groups of 25 and 1 of 24, so that average weights of calves in the groups were nearly identical. On Nov. 29, 1957, 2 groups were back-sprayed with 1 gallon of insecticide per calf. Bayer 21/199 wettable powder having a concentration of either 0.7 or 0.1 per cent active ingredient was used. The spray was applied to the calves individually at a pump pressure of 375 lb. per square inch (p.s.i.). One group of calves was left untreated. Calves were maintained in their original groups until Feb. 6, 1958, when they were regrouped for another experiment.

In the 1958 test, 83 calves were allotted at random to 2 groups of 28 and 1 of 27. On Nov. 28, 1958, the calves in 2 groups were given total body spraying with 1 gallon of insecticide per calf. The insecticide was 0.5 per cent Bayer 21/199 formulated either as an emulsifiable concentrate or a wettable powder. The spray was applied at a pump pressure of 380 to 400 lb. p.s.i. to small groups of 3 to 8 calves in a pen. The third group was left untreated. The calves were regrouped on Jan. 7, 1959, for another experiment.

In both experiments, counts of grubs appearing in the back were made at monthly intervals starting in early February and terminating in the first week of May. Individual ear-tag numbers were recorded and a complete record was kept of the number of grubs in the back of each calf. During the first week in January, half or more of the calves were carefully examined for lice, and an attempt was made to evaluate the effect of the insecticide in controlling lice. Cattle were weighed individually previous to treatment in November and at the termination of the experiment in May. Weight gain data were analyzed statistically by Student's "t" test in order to determine whether there were significant differences among groups.

Results

The larvae of *Hypoderma lineatum*, the common grub, do not reach the back until January in this area, and *Hypoderma bov-*

From the Montana Veterinary Research Laboratory (Montana Experiment Station and Livestock Sanitary Board cooperating), Montana State College, Agricultural Experiment Station, Bozeman. Paper No. 491, journal series.

The assistance of Mr. Walter Braughton in the care and handling of the experimental animals used in these trials is gratefully acknowledged.

*Co-Ral, Chemagro Corp., Kansas City, Mo.

TABLE 1—Grub Counts and Weight Gains in Cattle Back-Sprayed on Nov. 29, 1957, with 1 Gallon of Bayer 21/199 Wettable Powder, 1957-1958 Experiment

Treatment (percentage concentration of Bayer 21/199)	No. of calves	Average grub counts				Peak av. grub counts	Control (%)	No. with fewer than 6 grubs	Av. wt. gain in lb. Nov. 22 to May 5
		Feb. 1	Mar. 1	Apr. 4	May 5				
0.7	25	0.5	3.7	9.4	10.1	11.5	44.4	7	78.3
0.1	25	2.0	10.3	21.4	18.1	24.7	0	1	79.5
Untreated	24	1.0	9.2	19.0	18.4	20.7	.....	3	76.8

is, the northern grub, not until a month or two later.[16] In the 2 experiments reported here, only small numbers of grubs were found during the first week of February in untreated calves. By March, numbers of grubs in the backs of the calves had increased 6 to 9 times and reached their highest average numbers in April and May. In our 1956 experiment, largest numbers of grubs were seen in March and April.[10] For all 3 experiments, calves originated from the same ranch.

Percentage grub control is based on a comparison of peak average grub counts among the groups. Peak average counts were obtained by using the highest number of grubs which appeared in the back of each calf during the course of the experiment. While such a figure does not give precisely the total number of grubs harbored by the calves, it does approach it more nearly than an average taken on any one date (tables 1 and 2).

In the 1957 experiment, the calves were sprayed only along the back line with 1 gallon of either a 0.1 or 0.7 per cent concentration of the insecticide. No reduction in the numbers of grubs was observed in the calves sprayed with 0.1 per cent Bayer 21/199 when compared with the untreated calves; however, in the calves sprayed with 0.7 per cent concentration, a 44.4 per cent reduction was observed.

In the 1958 experiment, the calves received a total body spraying with 1 gallon of 0.5 per cent Bayer 21/199 which had been formulated either as an emulsifiable concentrate or a wettable powder. A 73.9 per cent reduction in numbers of grubs, when compared with the untreated calves, was seen in the group sprayed with the wettable powder. A 92.7 per cent reduction was observed in the group sprayed with the emulsifiable liquid formulation. Statistical analysis of the data indicated a difference between treated and untreated groups, and between treated groups at a 1 per cent level of significance.

Since the hides of cattle having more than 5 grub holes are classed as grade 2 at slaughter,[1] calves having fewer than 6 grubs during the whole period of examination were recorded. In the 1957 experiment, 12.5 per cent of calves in the untreated group had fewer than 6 grubs; and 8.0 per cent in the 0.1 per cent group and 28.0 per cent in the 0.7 per cent group had fewer than 6. In the 1958 experiment, numbers of larvae were higher than the previous year. None of the untreated calves had

TABLE 2—Grub Counts and Weight Gains in Cattle Body-Sprayed on Nov. 28, 1958, with 1 Gallon of Bayer 21/199 Emulsifiable Concentrate or Wettable Powder, 1958-1959 Experiment

Treatment (percentage concentration of Bayer 21/199)	No. of calves	Average grub counts				Peak av. grub counts	Control (%)	No. with fewer than 6 grubs	Av. wt. gain in lb. Nov. 24-May 1
		Feb. 6	Mar. 5	Apr. 3	May 1				
0.5 Emulsifiable concentrate	27	0.7	1.1	1.4	1.6	2.4	92.7	22	118.3
0.5 Wettable powder	28	1.0	5.4	6.8	7.2	8.8	73.9	15	98.1
Untreated	28	2.7	19.1	23.5	24.0	29.3	.....	0	108.3

fewer than 6 grubs, whereas 53.6 per cent of the group given wettable powder and 81.5 per cent of the group given emulsifiable liquid had fewer than 6.

In both experiments, only relatively small numbers of lice were present in the untreated calves. In the 1957 experiment, it was possible to find a small number of lice on the calves sprayed with 0.1 per cent Bayer 21/199, but none were found on those sprayed with 0.7 per cent. In the 1958 experiment, no lice were found on the treated calves, and the untreated calves were judged to have only light infestations with *Linognathus vituli*.

Individual weight gain records were kept on the calves during the course of the experiment (tables 1 and 2). These data were analyzed statistically and it was concluded that there was no significant difference between treated and untreated calves. The weight gain data from the 1957 experiment were examined to determine whether there was a correlation between number of grubs and weight gains regardless of treatment with Bayer 21/199, but no such correlation could be made (table 3).

Insecticide intoxication was not considered to be an important after-effect of treatment. One or 2 calves in the group sprayed with 0.1 per cent Bayer 21/199 in 1957 appeared somewhat depressed 2 hours after treatment. These calves were normal the following morning. None of the other calves in either experiment had any ill effects.

TABLE 3—Correlation Between Numbers of Grubs in the Backs of Calves Regardless of Treatment and Weight Gains of Calves from Nov. 22, 1957, to May 5, 1958

	No. of grubs							
	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-or more
No. of calves	11	10	12	10	8	9	6	6
Wt. gain in lb.	99.0	74.5	61.2	91.5	75.0	85.0	58.3	95.0

Discussion

Available technical reports in which Bayer 21/199 has been used against the larvae of *H. lineatum* and *H. bovis* are summarized (table 4). Reports were grouped according to the geographic area from which the cattle originated or the location where the work was done. In some cases, the data were condensed for the sake of brevity and, in others, the percentage control was not given as such by the author and was calculated from the figures which were given. Since concentrations and volumes of insecticide were given in several different combinations, the number of grams applied per animal at each spraying was calculated.

A number of facts can be readily inferred from the table. Intoxication with Bayer 21/199 has not been a problem and, where weight gains have been investigated, there was neither advantage nor disadvantage resulting from the treatment except in a single instance.[5] There appeared to be equal effectiveness against both *H. lineatum* and *H. bovis*. Except in our 1958 experiment, there were no reports of greater efficacy of an emulsifiable formulation when compared with the wettable powder although 2.6 times more emulsifiable liquid than wettable powder was found to be absorbed percutaneously.[14]

Efficacy of Bayer 21/199 was generally high (table 4). When the recommended amount or larger of insecticide (1 gal. of a 0.5% suspension or 18.92 Gm.) was applied to each animal, there were only 4 of 16 instances in which control failed to reach 90 per cent. In the 4 instances in which grub control fell below 90 per cent, cattle originated in Wyoming[4] and Montana (present study) and they were treated in November, a time when the hair is quite long. On the other hand, nearly 100 per cent control was observed in cattle originating in South Dakota, but treated at Kerrville, Texas.[5]

Of 24 instances in which the dosage level was 14 Gm. or higher, there were 7 cases in which grub control fell below 90 per cent. In 2 of the 7, only a back line spraying was carried out. Of those remaining, the length of the hair in 2 instances and also in this study may have prevented adequate coverage of the cattle.[4,9]

TABLE 4—Summary of Available Reports on the Use of Spray-Applied Bayer 21/199 in Controlling Cattle Grubs

Formulation*	Concentration (%)	Vol. in gal. applied per animal	Gm. of insecticide applied per animal	Spray pressure (lb./sq. in.)**	Type of coverage†	No. times sprayed	Month of spraying	Location or source of cattle	Hypoderma spp. present‡	No. of cattle	Efficiency§ (%)	Av. No. of grubs in control cattle	Intoxication	Wt. gain advantage	References
W	2.5	1/8	11.83	.....	Back	1	May	Belle Glade, Fla.	1	9	100	18	....	....	7
W	2.5	1/8	11.83	.....	Back	1	June	Belle Glade, Fla.	1	9	100	18	....	....	7
W	2.5	1/8	11.83	.....	Back	1	July	Belle Glade, Fla.	1	9	100	18	....	....	7
W	2.5	1/8	11.83	.....	Back	1	Aug.	Belle Glade, Fla.	1	9	100	18	....	....	7
W	2.5	1/8	11.83	.....	Back	1	Sept.	Belle Glade, Fla.	1	9	100	18	....	....	7
W	0.5	1/6	3.15	100	Back	1	June	Belle Glade, Fla.	1	22	82	14	....	....	8
W	0.5	1/6	3.15	100	Back	2	June & Sept.	Belle Glade, Fla.	1	18	96	14	....	....	8
W	0.5	1/6	3.15	100	Back	1	Sept.	Belle Glade, Fla.	1	23	34	14	....	....	8
W	0.75	1/2	14.19	.....	.....	2	June to Aug.	Crowley, La.	1	6	100	10	....	....	3
W	0.75	1/2	14.19	.....	.....	1	Aug.	Crowley, La.	1	6	100	10	....	....	3
W	0.75	1/2	14.19	.....	.....	1	June	Crowley, La.	1	17	98	10	....	....	3
W	0.50	1/2	9.46	.....	.....	1	July	Crowley, La.	1	40	99	8	....	....	3
W	0.50	1/2	9.46	.....	.....	1	July	Crowley, La.	1	23	100	15	....	....	3
W	0.25	1/2	4.73	.....	.....	1	July	Crowley, La.	1	30	100	15	....	....	3
W	0.50	1/2	9.46	.....	.....	1	July	Crowley, La.	1	35	96	5	....	....	3
W	0.50	1/2	9.46	200	Body	1	Aug.	Raymond, Miss.	1	10	82	13	....	No	12
W	0.50	1/2	9.46	200	Body	1	Oct.	Raymond, Miss.	1	11	55	16	....	No	12
W	0.50	1/2	9.46	200	Body	1	Aug.	Woodville, Miss.	1	12	80	11	....	No	12
W	0.5	1/2	9.46	200	Body	1	Sept.	Poplarville, Miss.	1	6	93	9	....	No	12
W	1.0	1/4	9.46	Wash	Back	1	.....	Kerrville, Texas	1	5	100	16	None	....	17
W	0.5	1/4	4.73	Wash	Back	1	.....	Kerrville, Texas	1	6	88	8	None	....	17
W	0.25	1/4	2.36	Wash	Back	1	.....	Kerrville, Texas	1	9	83	6	None	....	17
W	0.1	1/4	0.95	Wash	Back	1	.....	Kerrville, Texas	1	7	37	5	None	....	17
W	0.75	1-2	28.38 to 57.76	250	Body	5	Feb. 1 thru July	Kerrville, Texas	1	26	100	9	None	....	5

W	0.5	1 to ½	28.38	250	Body	1	June	Kerrville, Texas	l	17	99	11	None	....	5
W	0.25	1 to ½	14.19	250	Body	1	June	Kerrville, Texas	l	16	54	11	None	....	5
W	0.5	1	18.92	250	Body	1	July	Spur, Texas	l	98	90-95	7-19	None	Yes	5
E	0.75	1/2	14.19	100	Body	1	July	Camp Stanley, Texas	l	7	99-100	29	....	....	2
W	0.75	1/2	14.19	100	Body	1	July	Camp Stanley, Texas	l	7	99-100	29	....	....	2
W	0.37	1	14.00	225	Body	1	.....	Oklahoma	l	87	76-84	....	....	No	9
W	0.75	1/2	14.19	225	Back	1	.....	Oklahoma	l	155		....	....	No	9
....	0.75	3/4	21.29	350	Body	1	Oct.	Blacksburg, Va.	l&b	22	93-99	27 & 31	....	No	18
W	1.0	1/8	4.73	Wash	Back	1	.....	Corvallis, Ore.	l	2	100	14	None	....	15
W	0.50	1/8	2.36	Wash	Back	1	.....	Corvallis, Ore.	l	3	100	9	None	....	15
W	0.25	1/8	1.18	Wash	Back	1	.....	Corvallis, Ore.	l	1	80	20	None	....	15
W	0.10	1/8	0.47	Wash	Back	1	.....	Corvallis, Ore.	l	1	0	7	None	....	15
E	0.5	1/8	2.36	Wash	Back	1	.....	Corvallis, Ore.	l	1	100	15	None	....	15
W	0.5	1	18.92	350	Back	1	.....	Corvallis, Ore.	b	9	100	9	None	....	15
W	0.75	1 to ½	42.57	300	Body	1	Nov.	Highmore, S.D.	l&b	8	100	44	None	....	6
E	0.75	1 to ½	42.57	300	Body	1	Nov.	Highmore, S.D.	l&b	8	100	44	None	....	6
W	0.50	1 to ½	28.38	300	Body	1	Nov.	Highmore, S.D.	l&b	8	98	44	None	....	6
E	0.50	1 to ½	28.38	300	Body	1	Nov.	Highmore, S.D.	l&b	8	100	44	None	....	6
W	0.25	1 to ½	14.19	300	Body	1	Nov.	Highmore, S.D.	l&b	8	100	44	None	....	6
E	0.25	1 to ½	14.19	300	Body	1	Nov.	Highmore, S.D.	l&b	8	100	44	None	....	6
W	0.75	1/3	9.46	Wash	Back	1	Dec.	South Dakota	l&b	4	89	48	....	....	13
W	0.25	2	18.92	125	Body	1	Nov.	Wyoming	l&b	7	23	....	....	....	4
W	0.5	2	37.84	275	Body	1	Nov.	Wyoming	l&b	7	80	....	....	....	4
W	0.1	1	3.78	375	Back	1	Nov.	Sweet Grass Co., Mont.	l&b	25	0	21	None or mild	No	Pres. study
W	0.7	1	26.48	375	Back	1	Nov.	Sweet Grass Co., Mont.	l&b	25	44	21	None	No	Pres. study
W	0.5	1	18.92	390	Body	1	Nov.	Sweet Grass Co., Mont.	l&b	28	70	29	None	No	Pres. study
E	0.5	1	18.92	390	Body	1	Nov.	Sweet Grass Co., Mont.	l&b	27	92	29	None	No	Pres. study

*W—wettable powder; E—emulsifiable concentrate. **Pounds per square inch. †Coverage either as backline spraying (back) or total body spraying (body). ‡1—Hypoderma lineatum; b—Hypoderma bovis—if the species were not explicitly stated, they were inferred from the area where the cattle originated. §Some figures are approximations made for the sake of brevity, and others are calculated from authors' data where specific percentage control was not given. ||Approaches.

Summary

1) A 2-year study is reported in which 105 weaned Hereford calves were treated with Bayer 21/199 by spraying for control of cattle grubs, Hypoderma spp.

2) Backline spraying at a pressure of 375 lb. per square inch (p.s.i.) with 1 gallon at concentrations of insecticide of 0.1 and 0.7 per cent gave 0 and 44.4 per cent control, respectively. Total body spraying at 380 to 400 p.s.i. with 1 gallon of a 0.5 per cent concentration of insecticide resulted in 73.9 and 92.7 per cent control with wettable powder and emulsifiable concentrate formulations, respectively.

3) Although numbers of lice (*Linognathus vituli*) were relatively small, nearly complete elimination of infestations was observed at the 0.1 per cent concentration and complete elimination at the 0.5 and 0.7 per cent concentrations.

4) Little or no intoxication was observed in the calves following treatment.

5) There was no correlation between treatment and weight gains of calves, nor between numbers of grubs counted in the backs and weight gains, regardless of treatment.

6) Available technical reports on the use of Bayer 21/199 as a spray for controlling cattle grubs are tabulated and discussed.

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Barley Equals Corn for Fattening Steers

Steers gained weight rapidly and efficiently on a complete fattening ration using adequately supplemented rolled common barley as a sole source of both the grain and roughage. The cattle fed barley according to this new concept gained significantly faster and more efficiently than comparable steers on ground ear corn. Differences in selling price, shipping shrink, dressing percentage, and carcass grade were small and insignificant, even though slightly in favor of barley.—*51st Ann. Meet, of Am. Soc. Anim. Prod., Nov. 27-28, 1959.*

Pulmonary Aspergillosis in a Calf

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ASPERGILLOSIS, usually associated with moldy litter, is universally recognized as a disease entity in young chicks and poults, whereby inhalation of spores produces a disseminated mycotic pneumonia and air sac infection.[2,9] In large animals, however, this disease has been reported only occasionally.

Aspergillosis was reported in a cow in 1900,[7] and in a skunk in 1939.[4] European workers have reported pneumomycosis in horses and cattle,[1,3,5,6] sometimes involving an entire barn population, and usually traceable to moldy feed. An investigator[8] reviewing aspergillosis stated that the disease was not uncommon, but he cited European investigators only.

This report describes a case of pulmonary aspergillosis in a male calf, 6 weeks old, tissues from which were submitted to this laboratory for confirmation of a provisional diagnosis of tuberculosis. The nature of federal meat inspection is such that history and clinical signs were not available. The specimen material included portions of lungs, liver, and lymph nodes; half of each specimen was formalin-fixed and half, borax-coated.

The latter were placed under refrigeration; the former were "cut in" and processed for paraffin sectioning. Sections were cut at 7 μ, then stained with hematoxylin and eosin and by the Fite-Faraco method for acid-fast organisms.

Grossly and histologically, the liver and lymph nodes had no significant changes, but the lungs had multiple discrete granulomas whose centers were often necrotic (fig. 1). Microscopically, in the necrotic areas there were occasional aggregates of polymorphonuclear leukocytes surrounding brightly eosinophilic, radiating, clublike structures which, on casual inspection, resembled the familiar pattern of actinomycosis and actinobacillosis (fig. 2). However, hyphae-like structures were seen under higher magnification, both in cross section and sagittally, at the centers of the radiating clubs (fig. 3). Because of this unusual finding, additional sections were stained with Gomori's silver methenamine stain, whereupon numerous branching septate hyphae were found in the lesions (fig. 4). Many more of these structures were visible than by hematoxylin and eosin staining.

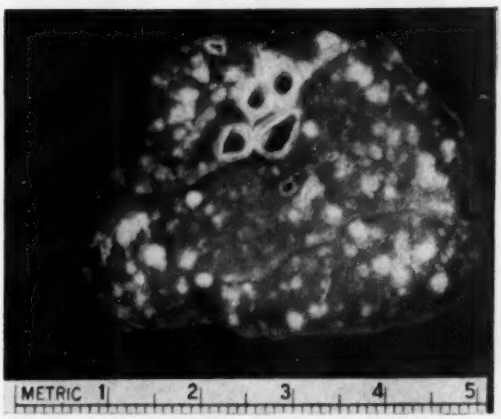

Fig. 1—The resemblance of aspergillosis lesions in a calf lung to miliary tuberculosis is evident in the gross specimen.

The similarity in morphology to *Aspergillus fumigatus*, compared with nonseptated *Mucor corymbifer*, stimulated further investigations using the borax-coated fresh lung tissue. Culturing this tissue on Sabouraud's agar resulted in a luxuriant

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The authors thank Dr. F. K. Ramsey for his guidance, Mrs. Carmen Raffety for slide preparations, and Dr. T. P. Kolodynski for contributing the specimens.

Fig. 2—Discrete granulomas of aspergillosis in the lung have central radiating club forms, each surrounded by a leukocytic infiltrate. x 100.

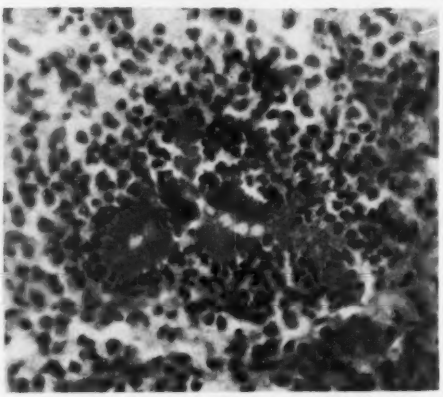

Fig. 3—Hyphae-like structures of aspergillosis are visible in lung cross-section and sagittal-section. x 430.

growth in 6 days, the identity of which was firmly established as *A. fumigatus*.

Fite-Faraco staining was negative for acid-fast bacteria.

Summary

Portions of lungs, liver, and lymph nodes from a slaughtered 6-week-old male calf were submitted for laboratory examination because tuberculosis was suspected. A portion of this material was sectioned and examined histologically, and the remainder was cultured on special medium. Both procedures indicated that this was a case of disseminated mycotic pneumonia caused by *Aspergillus fumigatus*, characterized grossly by the presence of numerous foci, resembling miliary tuberculosis, throughout the lung parenchyma. It is presumed that the infection resulted from the inhalation of spores in moldy bedding.

This appears to be the first case of pulmonary aspergillosis in cattle to be reported since 1900. Of additional interest was the finding in histologic sections of radiating club forms attached to the hyphae.

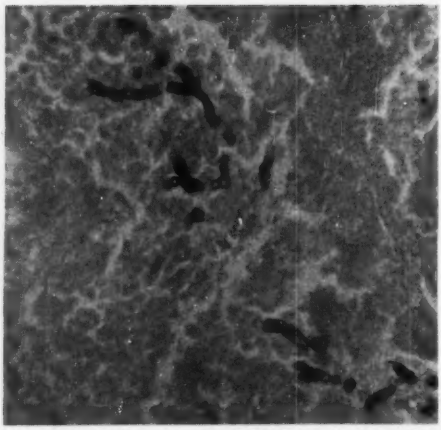

Fig. 4—Branching, septated hyphae of *Aspergillus fumigatus* are demonstrated using Gomori's silver stain. x 430.

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Intramedullary Fixation

in Fractures of the Equine Metacarpal Bone

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IN RECENT MONTHS, the authors employed open reduction fixation of 2 long bone fractures using the Jonas pin technique with auxiliary fixation. The results are reported.

Case 1

A purebred male Shetland pony, 4 years old, fractured his left foreleg. Two days later, the pony, with his leg in a temporary cast, was brought to the veterinary hospital at Michigan State University. On examination, a compound transverse fracture of the left cannon bone (large metacarpal) was found approximately at the midshaft. A sizeable triangular-shaped portion of bone was missing at the fracture site, having been lost through the wound at the time of injury.

The patient was given a general anesthetic, and the affected limb was clipped and prepared for surgery. The fracture wound was debrided and infiltrated with aqueous penicillin. One transverse, stainless steel pin (¼ in. by 12 in.) was placed through the radius dorsal to the knee (carpal joint), and another through the distal segment of the large metacarpal bone. These were joined and secured with Kirschner single clamps and bars on each side.

A plaster cast was applied, incorporating the Kirschner splint and leg from the proximal end of the radius down to and including the hoof. Good alignment was achieved, but the missing fracture segment was obvious.

Radiographs taken 7 weeks later indicated that little callus had developed. It was decided to leave this cast and pinning apparatus in place for an extended time to permit sufficient callus to develop.

On clinical examination of the fracture area at 12 weeks, rubbery movement and little evidence of a palpable callus was evident. A plaster walking cast was next applied, incorporating the protruding transverse pins, and left in position for another month. At the end of this period, which was 5 months from the time of the original fracture, the bone was no longer in alignment (fig. 1), and there was no union of the fractured bone ends. It was then decided to use a bone graft, an intramedullary pin, and a walking cast.

Ordinarily, bony callus is laid down in the marrow cavity of the fracture segments in a nonunion fracture. With this in mind, it was decided to employ a Jonas intramedullary pin to aid in maintaining end-to-end alignment. With the bony callus present in the marrow cavity, it was possible to have a snug-fitting Jonas intramedullary pin. However, if the fracture had been a fresh one, the marrow cavity would have been approximately 4 times the diameter of the pin and, thus, a loose fit. In order to stimulate callus formation in fractures of this type in other animals, bone chips and bone grafts have been employed. As a source of bone, the 17th and 18th ribs from a donor horse were aseptically resected free of periosteum and sealed in sterile glass jars. These were stored in the freezer at 20 F. until time of fracture fixation.

An open reduction was performed by making a longitudinal incision through the skin and fascia on the medial surface of the metacarpal bone, exposing the old fracture site. All remnants of the fibrous callus were cut away from the callused fracture ends with a rongeur forceps. The medullary cavity was prepared for the Jonas pin, which was inserted by holding the fractured ends at approximately a 90-

From the Department of Surgery and Medicine, College of Veterinary Medicine, Michigan State University, East Lansing.

Fig. 1 (left)—Nonunion fracture of metacarpal bone of the Shetland pony. The distal transverse pin from the original fixation was still in place when this picture was taken.
Fig. 2 (center)—Lateral view of metacarpal fracture following insertion of Jonas pin and bone chips and application of walking cast.
Fig. 3 (right)—Anterior-posterior view of metacarpal fracture following insertion of Jonas pin and bone chips and application of walking cast.

degree angle. The larger portion of the Jonas pin was inserted in the dorsal segment and the bone ends aligned so that when the spring was released the plunger pin was forced into the medullary cavity of the distal segment.

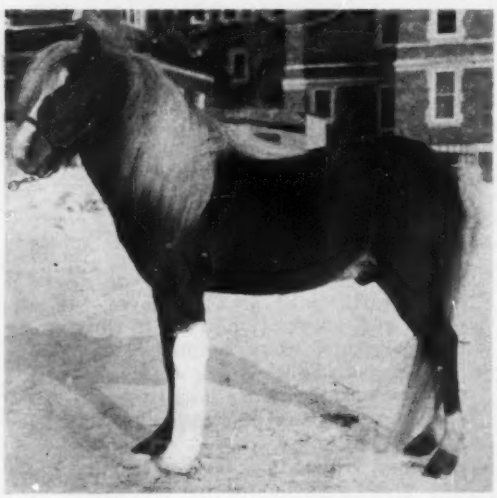

Fig. 4—Pony with metacarpal fracture treated with intramedullary pin and bone grafts is shown just prior to removal of walking cast.

Fig. 5—Metacarpal fracture in a Shetland pony 5 months following intramedulary fixation—(A) anterior-posterior view and (B) lateral view.

Rongeur forceps were used to cut the bone graft into small pieces (about 1 cm. in diameter) which were carefully placed around the fracture site (fig. 2 and 3). About ½ cup of bone chips were used. The skin incision was closed, the leg booted in surgical felt, and a fast-setting plaster-of-paris walking cast applied (fig. 4). Radiographs taken 12 weeks later gave definite indication of healing with incorporation of the bone from the donor horse into the forming callus. Four months later, a firm union had occurred with only slight external enlargement to mar the appearance of the leg, and the walking cast was removed (fig. 5 A and B). A shoe with the branches extended posteriorly was placed on the hoof to aid in support until the tendons regained tone and became accustomed to bearing weight.

Case 2

A purebred Arabian filly, 4 days old, was discovered with a simple transverse midshaft fracture of the large metacarpal bone. The same procedure was used as in case 1, except that a bone graft was not necessary. The Jonas pin, large size, was inserted into the medullary cavity of the proximal segment, the fracture reduced, and the spring released to drive the pin into the previously prepared channel in the medullary cavity of the distal segment (fig. 6 and 7). A walking cast was applied and then removed in 5 weeks. The foal developed a firm bony callus at the fracture site and the bone was straight from both anterior-posterior and lateral views. A well-padded, light aluminum spoon splint was applied and secured by adhesive tape to give additional support for 2 more weeks.

Summary

Fractures in 2 horses were reduced with an expansion-type stainless steel intramedullary implant. Both horses seemed to tolerate the foreign substance well. Arrangements have been made for semiannual radiographic study on 1 horse, to follow the progress of the stainless steel pin within the cannon bone.

In case 1, failure on the initial attempt at fixation was probably due to the sizeable gap created by the loss of the segment of bone at the fracture site. The use of bone chips from the rib of a donor horse aided

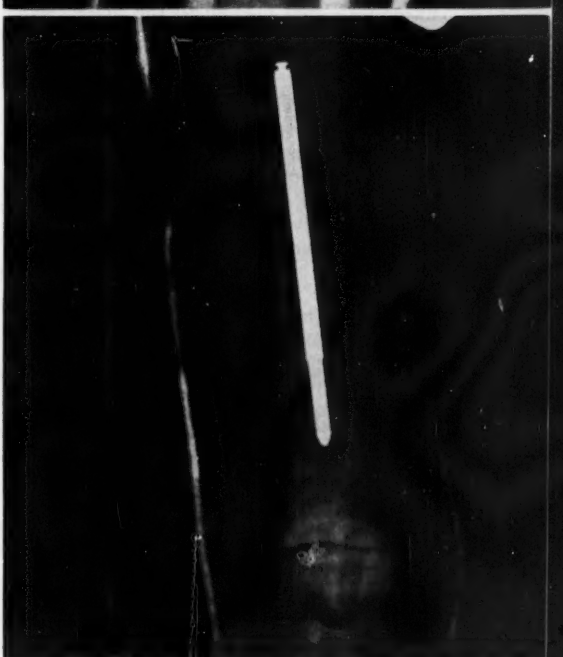

Fig. 6—Lateral view of fractured metacarpal in an Arabian filly with Jonas pin inserted and walking cast applied.

Fig. 7—Anterior-posterior view of fractured metacarpal in an Arabian filly with Jonas pin inserted and walking cast applied.

development of a satisfactory bone callus. This is the first time the authors have employed bone from a donor in the horse. Wide application of this technique could conceivably salvage some horses with fractures such as nonunions, transverse fractures in older horses, or fractures in which a portion of the bone is missing.

Surgical Treatment of Two Horses with Urinary Lithiasis

Urinary lithiasis in an 11-year-old gelding came to the owner's attention because the horse seemed to lose its "spirit." Also, blood had been noticed in the urine. When the horse was in the stable, urine was normal in color but, after exercise, it was chocolate colored.

On examination, the horse was found to be in good condition, with normal pulse rate and temperature. The penis was partially protruded almost continuously. There was frequent straddling of the hindlimbs with attempts to urinate, but only small quantities were voided. On rectal examination, a hard, spherical mass (about 3 inches in diameter) found on the pelvic floor was believed to be the urinary bladder firmly contracted on a calculus.

The horse was cast by rapid intravenous administration of 2 Gm. of pentobarbital sodium immediately followed by 92 mg. of succinylcholine chloride. After applying hobbles, deep general anesthesia was induced by slow intravenous infusion of 70 Gm. of chloral hydrate in 10 per cent solution. Induction anesthesia gave full anesthesia for 40 minutes, and then some straining commenced during peritoneal manipulation. Anesthesia was deepened and maintained for the remaining 20 minutes by periodic infusions of thiopental sodium, a total of 3.3 Gm. being given. The horse rose to its feet without stimulation 4 hours after the operation was completed.

A laporatomy incision, 8 inches long, was made 2 inches lateral to the prepuce on the left side, with the posterior commissure about 2 inches in front of the inguinal ring. The presence of a complex venous vascularity in this area was recognized.

The contracted bladder, which formed a mass slightly smaller than a clenched fist, was located and gripped behind the calculus. By applying slow and gradually increasing traction to the organ, it was possible to draw it just adjacent to the edges of the posterior commissure of the incision. In this way, one operator kept the organ in this position throughout the operation and at the same time prevented exposure of the intestine.

A 2½-inch incision was made in the bladder over the vertex and including the urachal cicatrix. The calculus was removed, and the bladder wall was closed in 2 layers using No. 3 catgut suture. The mucosa was closed with a continuous suture, and the musculature and serosa were closed with a layer of interrupted sutures. No attempt was made to invert the bladder wall in the Lembert fashion. Penicillin, dissolved in a small volume of water, was poured into the abdominal cavity, and all layers of the abdominal incision were freely treated with penicillin cerate and dusted with sulfanilamide during suturing.

Frequent puncture of the ramifying branches of the external pudic vein occurred where the deep sutures were placed. It was impossible to control venous bleeding with forceps or ligature, but the hemorrhage was not considered serious. How-

ever, extensive extravasation in the deeper layers of the wound occurred.

On postoperation day 1, there was marked edematous swelling at the wound site. The horse was listless but passed urine readily. Antibiotics were given. By postoperation day 3, the ventral abdominal edema along the course of the posterior abdominal vessels formed a tense ridge about 9 inches wide and 4 inches deep, extending forward almost to the forelegs. Antibiotic therapy was continued. By postoperation day 8, the horse was eating well and urinating normally, and the edema had begun to subside; 5 days later, the edema was almost gone.

During 15 years, in 1,000 horses at this field station (Liverpool, England), there were 5 cases of urinary lithiasis; 3 in geldings and 2 in mares.—*Vet. Rec., 72, (April 16, 1960): 301.*

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A 3-year-old Standardbred gelding experienced difficulty in urinating. He voided blood immediately after exercise and his physical condition was generally poor. On rectal palpation, a cystic caluclus approximately 2 inches in diameter was found.

An operation was perfomed to remove the calculus. The gelding was given a tranquilizer intravenously and local anesthetic epidurally. The operation was performed with the horse standing. A midline incision was made below the anal sphincter, through the skin and underlying tissues. A longitudinal incision, about 2 inches long, was made in the urethra. A Knowles pattern vulsellum forceps was inserted through the urethral incision and into the bladder. The calculus was held in place *per rectum* while the forceps was attached to the calculus which was removed with difficulty through the neck of the bladder. The urethral incision was left open, but 2 sutures were placed in the upper part of the skin incision.

The wound healed in 5 days, after which time all urine was voided in a normal manner. Antibiotics were administered each day for 5 days and tetanus antitoxin was also given. Light exercise was started on the second day. Six months later, the horse was running well and had a normal, healthy appearance with a considerable increase in weight.—*Canad. Vet. J., 1, (May, 1960): 221.*

Effect of Piperazine on *Strongylus vulgaris* and *Strongylus equinus*

In 34 per cent of 89 slaughtered horses and in fecal specimens from 253 work horses from southern Germany, *Parascaris equorum* was found. In 91 per cent, *Strongylus vulgaris* and *Strongylus equinus* were found and, in 47 per cent, small strongylids were found. Differentiation between the eggs of *S. vulgaris* and *S. equinus* was made on the basis of size and other morphologic characteristics.

Seventy-eight infected horses were experimentally treated with piperazine adipate and piperazine citrate. A dose of 70 to 80 Gm. of piperazine for a medium-sized horse eliminated, on one application, 83 per cent of the ascarids, 86 per cent of the small strongylids, and 61 per cent of the 2 large palisade worms. Unlike other anthelmintics, piperazine is nontoxic and effective even for anemic horses.—*Vet. Diss., 1959; abstr. in Die Vet.-med., 13, (1960): 177.*

Hypertrophic Pulmonary Osteoarthropathy

in a Horse — A Case Report

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T. J. HAGE, D.V.M., M.SC.

HYPERTROPHIC pulmonary osteoarthropathy is a noncontagious disease of man and animals, characterized by bilaterally symmetrical proliferation of the periosteum of the long bones of a limb. With rare exception, the bony changes are secondary to lesions of the thoracic cavity. The bones of the limbs are mainly affected, but other bones of the skeleton may be involved. This disease has been reported in the horse, cow, sheep, deer, lion, dog, cat, fowl, and rabbit.[1-12]

It is the purpose of this paper to report on a case of the disease in the horse. In this case, the disease was secondary to a large abscess in the diaphragmatic lobe of the right lung.

Case History

A three-quarter Arabian mare, 3½ years old and weighing about 700 lb., was admitted to the clinic with the following history:

Six weeks previously, the horse had been given a penicillin injection because she had a cough and nasal discharge of 5 days' duration. Two weeks after the injection, her knees started to swell. Approximately 1 week later, the hocks and the fore fetlocks began to swell. She had been eating and drinking normally but did not want to move unless forced. During this 6-week period, the cough and nasal discharge had remained the same, but the swelling of the legs and reluctance to move had become progressively worse.

Clinical Signs

When admitted to the clinic, the horse was in good condition and had a normal appetite but was listless. The pulse rate was 52 per minute and the body temperature was 100.6 F. The heart rate was 52 per minute and the sounds were normal; the respiratory rate was 24 per minute. She had a harsh productive cough that could easily be induced with pressure over the larynx. There was a bilateral, foamy, blood-tinged, and odorless nasal discharge. The nasal mucous membranes and the conjunctivae were hyperemic. Inspiration and

Fig. 1—Bilateral enlargement of the fetlocks and carpi in the forelegs of a horse with hypertrophic pulmonary osteoarthropathy.

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expiration produced a gurgling sound that could be heard several feet away. On auscultation of the chest, marked moist râles were detected on both the right and left sides.

There was a bilateral hard, painful, nonedematous swelling of both fore fetlocks (fig. 1). This included an area from about 2 inches above the fetlock down to the coronet. Both carpi were hot, painful on palpation, and edematous (fig. 1). This included an area extending from about 2½ inches above the carpus down to the proximal end of the third metacarpus. Flexing the carpi or fore fetlocks, was painful. There was an increased digital pulse on both forelegs.

The hocks were hot, painful, and edematous. This swelling extended from the level of the tuber calcis to about 1 inch below the level of the last row of tarsal bones. The rear pasterns had a mild, cold, nonpainful, and edematous swelling.

There was no evidence of pain or swelling when the bones of the trunk and head were palpated.

The above clinical signs did not change during the 24 days that the horse was in the hospital, except that on days 6 to 11 her temperature was elevated. The elevated temperature ranged from 102 to 103 F. On day 12, her temperature returned to normal and remained so until she was euthanatized on day 24.

Radiography

Radiographs revealed a heavy shaggy periostitis involving the first phalanges, the metacarpal (fig. 2) and carpal bones of the front legs, and the proximal ends of the metatarsal and tarsal bones. The first phalanges of the rear legs were not involved. The radii revealed a periostitis which was smooth and was laid down in smooth parallel layers. There was a large, well-circumscribed, round density in the dorsoanterior aspect of the thorax, which extended horizontally from the ninth intercostal space anteriorly and vertically from the dorsal border to a point just below the base of the heart (fig. 3). On right and left ventral oblique positions, this was found to involve the right lung. There was some increase in density of the lung markings indicating inflammatory reaction in the involved lung.

Fig. 2—Anterior-posterior and lateral radiographs of the right front fetlock of a horse with hypertrophic pulmonary osteoarthropathy. There is shaggy periostitis involving the first phalanx and the distal end of the third metacarpal bone.

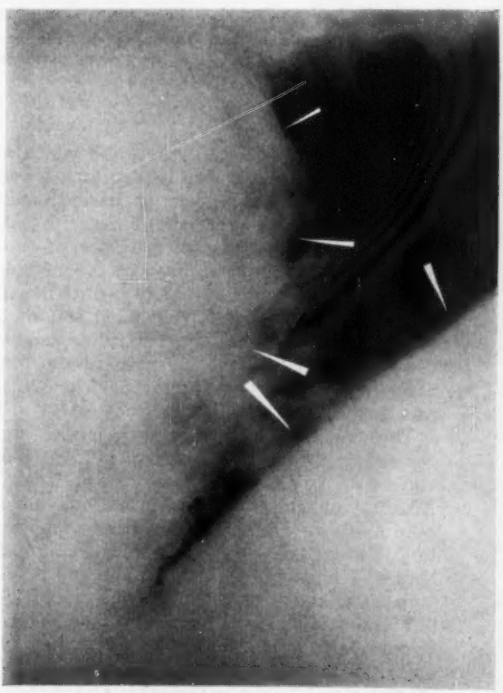

Fig. 3—Lateral radiograph of the chest of a horse with hypertrophic pulmonary osteoarthropathy. Arrows pointing to the left outline the large pulmonary abscess and arrows pointing to the right outline the diaphragm.

Fig. 4—Large abscess from the right diaphragmatic lobe of the lung of a horse with hypertrophic pulmonary osteoarthropathy.

Laboratory Findings

Acid-fast stain, culturing, and smears of the nasal exudate, and aspirations from the pericardial sac and lung parenchyma did not reveal the presence of an acid-fast organism or a neoplastic condition. Complete blood counts were taken on November 25 and December 8, 17, and 18; white blood cell counts were 15,600, 13,000, 11,300, and 12,100/cmm., respectively. The other values were well within the normal range for horses other than Thoroughbreds. The urine was normal.

The alkaline phosphatase levels on November 25 and December 1 were 8.5 and 6.6 Bodansky units, respectively. Alkaline phosphatase determinations have been made on 4 other horses at this laboratory. Two of these were on clinically normal horses, 1 on a horse with plasma cell myelomatosis, and 1 on a colt with a rachitic-like condition. The values of these determinations ranged from 2.1 to 2.9 Bodansky units. In man, a rise in the alkaline phosphatase level is not associated with hypertrophic pulmonary osteoarthropathy. These values may or may not be above the normal range for a horse, but do seem to be significantly higher than the values obtained from the limited number of determinations made previously.

Necropsy Findings*

The only significant lesions seen on necropsy were in the respiratory system and the skeleton. The left lung was essentially normal; it collapsed when the thorax was opened and was pink and uniform in texture. In the diaphragmatic lobe of the right lung, there was a large abscess approximately 30 cm. in diameter (fig. 4). This abscess had a thick fibrous capsule with a center of liquid pus and a great deal of dry granular material. The abscess had occluded many of the air passages in this lung. There was what appeared to be a secondary pneumonia involving the apical lobe and ventral portions of the diaphragmatic lobe of this lung. The right intermediate lobe was also completely solidified. The right side of the heart was moderately dilated, and there was fluid in the pericardial sac.

*Excerpts from the necropsy protocol written by Dr. P. C. Kennedy, pathologist.

A *beta* hemolytic, long-chain Streptococcus was isolated from the lung abscess.

Sagittal section of the left front leg revealed an exostosis of approximately 2 cm. thickness surrounding the dense cortical bone on the first phalanx and the proximal and distal ends of the third metacarpal bone.

Removal of the soft tissues from the front and rear legs revealed that there was a bony exostosis which involved the first phalanges, the metacarpal and carpal bones and radii of the front legs, and the metatarsal and tarsal bones of the rear legs. There were no articular surfaces involved.

On histologic section, the wall of the abscess consisted primarily of a fibrous wall in which there were focal areas of inflammatory cells. There were also some remaining lung elements present. Sections of the remaining right lung tissue revealed chronic but active areas of pneumonia. These areas were confined almost entirely to the larger air passages in which there were masses of neutrophils and necrotic debris.

Sections through the exostosis at the distal end of the radius showed an essentially normal cortical bone surrounded by an orderly exostosis. The laminae of the exostosis were arranged perpendicular to the laminae of the normal cortex. Both osteoblasts and osteoclasts were seen in new bone. The periphery of the exostosis was covered by a thick fibrous layer, the inner portion of which contained osteoblastic elements.

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Vaccination Against Johne's Disease—Results of a Field Trial

Vaccination of cattle against Johne's disease has been widely practiced in France for more than 30 years and on a limited field trial scale in Great Britain since 1946. The type of vaccine used was originally developed by Vallée and Rinjard in France and consists of living *Mycobacterium johnei* suspended in oils. When inoculated subcutaneously, it causes a fibrous nodule to form at the site of inoculation which may persist for years.

It is difficult to assess its value under laboratory conditions, but experience in the field strongly suggests that it confers a useful level of protection in the majority of herds. It may, on occasion, produce excessively large nodules, especially after revaccination, but its most serious disadvantage is that it sensitizes animals strongly and persistently to both avian and mammalian tuberculins.—*Vet. Rec., 71, (Dec., 1959): 1154.*

Experimental Evaluation of Culture and Serum Vaccination for the

Control of Swine Erysipelas

VIII. Further Observations on Serum Potency with Relation to Immunization of Weanling Pigs

Richard D. SHUMAN, B.S., D.V.M.

AS PREVIOUSLY REPORTED,[2] a satisfactory range of serum potency was needed in connection with simultaneous culture and serum vaccination of weanling pigs farrowed by dams susceptible to erysipelas infection. The results of an earlier experiment[3] indicated an approximate maximal range, but not the minimal range. The objective of the experiment reported here was to find the minimal range of potency of antiswine erysipelas serum.

Materials and Methods

ARS lot 10 standard anti-swine erysipelas serum was used as the base serum in this experiment. Preliminary replicated serum protection tests were conducted in male white mice that weighed about 18 Gm. By testing two different concentrations of ARS lot 10 (lot A), 2 ascending median effective doses (ED-50) were obtained over the ED-50 of lot H of the previous experiment.[3]

These two concentrations, lot J and lot K, were dilutions of lot A at a ratio of 1:10 and 1:13, respectively. Dilutions were made in 0.85 per cent sodium chloride solution which contained 0.5 per cent phenol.

Lot A was retested in conjunction with serum lots J and K for relative comparison of ED-50's. A minimum of 8 mice was used for each progressive dose of serum from 0.1 ml. through 0.9 ml. The serum and the exposure culture suspensions were administered simultaneously and were inoculated subcutaneously on opposite sides of the abdomen. The serum potency was determined on the basis of how many mice lived and how many died 14 days after inoculation, and the ED-50's were computed by the method of probit analysis.[1]

Preparation and use of the freeze-dried exposure culture of *Erysipelothrix rhusiopathiae*, strain 7873, with one exception was the same as previously reported.[3] In place of a titration for each test, retention of virulence for mice was shown by inoculating 7 to 12 mice, in most instances 8, with the exposure culture suspension immediately following completion of the serum protection tests. The viability count of the exposure dosage for mice for each test ranged from 720 to 2,656 cells/0.1 ml., a mean of 1,515 cells. Mice inoculated to demonstrate virulence of the exposure culture suspension died between postinoculation days 2 and 4, a mean of 3 days.

In this experiment, 72 pigs were used, 36 principals and 36 controls. They were farrowed by 12 dams, which after weaning their pigs, were shown to be susceptible to erysipelas infection by the percutaneous, or skin scarification, method of exposure.[3] All 12 litters were represented once in the 4 experimental groups, and in the litter control group. The surplus pigs of 3 litters were distributed as contact controls. Five pigs, including a contact control, were placed in a single pen. The litter controls, although in the same barn, were separated from the nearest pigs by an empty pen and an outside run. The pigs were not allowed in the outside runs until postvaccination observations were completed. They were kept on concrete floors and runs until several days after the percutaneous exposure, at which time they were placed in outside lots on dirt. The pigs were fed a balanced ration containing an antibiotic* at the rate of 6 lb. to a ton of feed. Iron-dextran,** 2 ml. intramuscularly, was administered to each pig at 3 to 5 days of age.

The pigs were vaccinated at 50 to 58 days of age, a mean of 53.9 days. Weanling pigs in the 4 experimental groups were vaccinated with 0.5 ml. of commercial desiccated virulent culture, reconstituted as directed by the producer. Pigs in 3 of these groups, G, J, and K, were given serum lots G, J, and K,

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The author thanks Dr. T. G. White of this division and Mr. Paul D. Homer, student assistant, for their help in conducting this experiment; and Drs. W. R. Harvey and K. A. Tabler, Livestock Research Staff, Biometrical Services, ARS, USDA, Beltsville, Md., for making the biometrical analysis of the data derived from mice.

*Aurofac, American Cyanamid Co., Pearl River, N.Y.

**Armidexan, Armour Veterinary Laboratories, Kankakee, Ill.

respectively. Pigs in group 4 were not given serum and served as culture controls. Inoculations of culture and serum were given subcutaneously in the right and left axillary space. After vaccination, the daily temperatures were recorded for 7 days for pigs in groups G, J, and K, and for 10 to 14 days for the pigs in the culture control group. Daily observations of the sites of culture inoculations were made from days 2 to 7. Hemocultures of the principals were made on postvaccination days 3, 4, and 5 by withdrawing approximately 20 ml. of blood aseptically from the anterior vena cava, and inoculating the entire amount in flasks containing 150 ml. of beef infusion broth. Subcultures of the broth were made after 48 hours' incubation at 37 C. and examined for the presence of *Ery. rhusiopathiae*.

Ninety-five days after vaccination, all the pigs were exposed to swine erysipelas infection by the percutaneous or skin scarification method. When the cutaneous lesions disappeared from those pigs that had reacted, the pigs were placed in outside lots for approximately 2 months to see if joint abnormalities developed. The pigs were then killed, and abnormal-appearing joints were opened, examined, and cultured.

Results

Tests in Mice.—An ED-50, expressed in milliliters of serum, was obtained from tests in mice for the serum lots as follows: lot A -0.027, lot J -0.326, and lot K -0.447 (table 1). Retesting of lot A serum in mice gave an ED-50 of 0.027 ml.; this was comparable to 0.030 ml., which was the result of previous tests that also included lot G.[3] Therefore, serum lots J and K were progressively less potent than lots G and H.

Response to Vaccination in Weanling Pigs.—A cutaneous lesion appeared at the site of culture vaccination of all the pigs. In addition, 2 of 12 pigs given lot J serum, 1 of 12 pigs given lot K serum, and 11 of 12 pigs given only the culture vaccine had generalized infection, which was manifested by urticarious lesions not directly associated with the vaccination site.

Erysipelothrix rhusiopathiae was isolated from the blood of 3 pigs given lot G serum, from 7 pigs given lot J serum, from 3 pigs given lot K serum, and from all 12 pigs given only the culture vaccine (table 2,A).

Of the pigs in the 3 groups given serum, temperature increases to 104 F. or above were least pronounced in pigs of group G and most pronounced in pigs of group K; however, this difference in temperature increases was not apparent at higher temperatures. Two pigs in each of the 3 groups given serum had temperatures of 105 F. or above, and 1 pig of group J had a temperature of 106 F. or above. All 12 pigs of the culture control group had temperatures of 105 F. or above, 8 of them 106 F. or above, and 3 of them had 107 F. or above (table 2,A).

One pig given lot J serum died following venipuncture on postvaccination day 5. Death was attributed to cardiac insufficiency due to a fibrinous pericarditis with excessive pericardial fluid and precipitated by restraint. However, this pig was ill at the time; *Ery. rhusiopathiae* was isolated from all 3 hemocultures, 5 body organs, and 2 urticarious lesions. Five pigs of the culture control group died, 1 each on postvaccination days 5, 6, 7, 9, and 52. *Erysipelothrix rhusiopathiae* was isolated from 3 or more body organs of the 5 pigs, 1 or more joints of each pig, and from the skin of all except the pig that died on day 52. The pig that died on day 5 died during venipuncture, and its death was attributed to the necessary restraint associated with pneumonia and with acute erysipelas.

In 3 pen-contact pigs of the culture control group, infection was evident. One pig became ill on day 7 after pen mates were inoculated; it had evidence of generalized swine erysipelas infection. A second died on day 21; *Ery. rhusiopathiae* was isolated from 5 body organs, 4 joints, and from an urticarious lesion. The third pig had a

TABLE 1—Mouse Bioassay, Combined Data

Serum lot	Dilution ratio	Total tests (No.)	Total mice (No.)	Standard error of ED-50 (logs)	ED-50 (ml.)	95% confidence interval; mean ED-50 (ml.)	95% confidence interval among tests for ED-50 (ml.)
A	1:1	18	735	0.037	0.027	0.023-0.032	0.013-0.056
G	1:7	7	378	0.060	0.208	0.158-0.275	0.101-0.422
J	1:10	11	985	0.048	0.326	0.261-0.406	0.157-0.675
K	1:13	10	801	0.065	0.447	0.339-0.603	0.216-0.925

Lot A = undiluted ARS lot 10, ratio 1:1; lot G = 1:7, 1 part serum and 6 parts diluent, etc. Lot G = Data from previous test results.[3] Standard deviation in logs among tests = 0.158.

slight temperature rise (104.2 F.) on the days 9 and 10, but no other visible signs of disease.

Protection Induced in Pigs 95 Days After Vaccination.—The following results summarize 2 weeks of observation after percutaneous exposure (table 2,B):

Lot G.—All 12 pigs were completely immune.

Lot J.—Ten of 11 pigs were completely immune and 1 was susceptible. The susceptible pig had only a localized cutaneous reaction to 1 of the 4 exposure cultures.

Lot K.—Eleven of 12 pigs were completely immune and 1 was susceptible. The susceptible pig had only a localized cutaneous reaction to 1 of the 4 exposure cultures.

Culture Controls.—The remaining 7 pigs were completely immune.

Pen-Contact Controls.—Two of 11 pigs were completely immune and 9 were susceptible. The susceptible pigs had generalized infection. One susceptible pig died; *Ery. rhusiopathiae* was isolated from 5 body organs, 4 joints, and an urticarious lesion.

Litter Controls.—Two of 12 pigs were completely immune and 10 were susceptible. The susceptible pigs had generalized infection.

Observations for Joint Abnormalities 2 Months After Percutaneous Exposure.—Ten pigs had questionable to marked enlargement of one joint or more and had no visible lameness to marked impairment of locomotion. The results of examination of joints are:

Lot G.—One pig, although not lame, had a slight enlargement of a tarsal joint and had a tissue change within this joint in association with chronic arthritis; *Ery. rhusiopathiae* was isolated.

Pen-Contact Controls.—One pig in group J had no lameness, questionable enlargement of a tarsal and carpal joint, and no tissue change within the joints; *Ery. rhusiopathiae* was isolated from both joints. One pig in group K had no lameness, definite enlargement of a tarsal and carpal joint, and tissue change within each joint; *Ery. rhusiopathiae* was isolated from both joints. One contact pig in the culture control group that became arthritic following vaccination of the pen mates had marked impairment of locomotion and marked enlargement of both carpal and tarsal joints. In addition to connective tissue proliferation, there was erosion of the articulating cartilage and ankylosis with calcification; *Ery. rhusiopathiae* was isolated from the 4 joints examined.

Culture Controls.—Two pigs did not appear lame, and 2 had marked impairment of locomotion. One pig that did not appear lame had enlargement of a tarsal joint, but no tissue change within the joint; this joint was bacteriologically sterile. The second pig had marked enlargement of both carpal joints and 1 tarsal joint and tissue changes within the joints; *Ery.*

TABLE 2—Comparative Swine Protection Tests with Diluted Anti-Swine Erysipelas Serum

A. AFTER VACCINATION

Serum lot	Dilution ratio	Dosage: Culture (ml.)	Dosage: Serum (ml.)	Pigs (No.)	Cutaneous response: Inoc. site (No. pigs)	Cutaneous response: Gen. (No. pigs)	Ery. rhusiopathiae positive hemoculture (No. pigs)	Temperature response (F.) at or above: 102	103	104	105	106	107
G	1:7	0.5	10.0	12	12	0	3	12	11	4	2	0	0
J	1:10	0.5	10.0	12	12	2	7	12	10	9	2	1	0
K	1:13	0.5	10.0	12	12	1	3	12	12	11	2	0	0
Controls:													
Culture	.....	0.5	.....	12	12	11	12	12	12	12	12	8	3
Contact	.....	....	----	12	—	....	....	12	7	3	1	1	0

B. AFTER PERCUTANEOUS EXPOSURE

Serum lot	Dilution ratio	Dosage: Culture (ml.)	Dosage: Serum (ml.)	Pigs (No.)	Cutaneous response*: I (No. pigs)	SL (No. pigs)	SG (No. pigs)	Temperature response (F.) at or above: 102	103	104	105	106	107
G	1.7	0.5	10.0	12	12	0	0	12	6	0	0	0	0
J	1:10	0.5	10.0	11	10	1	0	10	5	0	0	0	0
K	1:13	0.5	10.0	12	11	1	0	12	9	1	0	0	0
Controls:													
Culture	.....	0.5	.....	7	7	0	0	7	3	0	0	0	0
Contact	.....	....	.....	11	2	0	9	11	10	9	9	9	2
Litter	.....	....	.....	12	2	0	10	12	12	11	10	9	4

*I = completely immune; SL = susceptible, localized; SG = susceptible, generalized.

rhusiopathiae was isolated from all 3 joints. The 2 crippled pigs had marked enlargement of 3 or more leg joints and tissue changes within the joints, that is, connective tissue proliferation, erosion of the articulating cartilage, and ankylosis with calcification; *Ery. rhusiopathiae* was isolated from the 9 joints examined. One crippled pig, however, was noticeably arthritic after vaccination and the condition worsened progressively.

Litter Controls.—One pig had a marked enlargement of one carpal joint and a second had marked enlargement of both carpal and tarsal joints and tissue change within the joints; *Ery. rhusiopathiae* was isolated from the 5 joints examined.

Discussion

On a group basis, the response to vaccination indicated that this method was again ineffective in demonstrating the minimal level of serum potency for the simultaneous culture and serum vaccination of weanling pigs farrowed by susceptible dams. A greater number of pigs of the culture control group had temperature increases to 105 F. or above, *Ery. rhusiopathiae*-positive hemocultures, and generalized infection, than pigs in any of the 3 groups that were given culture vaccine and serum. On an individual basis, however, an approach to the minimal level of serum potency was believed to be demonstrated in the 2 pigs in each of groups G, J, and K that had temperatures of 105 F. or above, and particularly in the 2 pigs in group J and in the 1 in group K that had generalized infection.

Since there was decreasing potency of serum lots G, J, and K, respectively, in mice, the same decrease in potency would have been expected to be reflected clinically in pigs. Visible responses of pigs in groups G and K appeared similar, except for the temperature increases to 104 F. or above (but less than 105 F.) beginning with the pigs in the group given lot G serum, and the 1 pig that had generalized infection in the group given lot K serum. Furthermore, the pigs that were given lot J serum of intermediate potency reflected a greater degree of infection than those of group K, since more pigs had *Ery. rhusiopathiae*-positive hemocultures and, to a lesser extent, generalized infection. It would seem that although the ED-50 determination indicated differences in serum potency in mice, the difference at these concentrations was not great enough to be sufficiently reflected on a group basis in pigs.

After simultaneous culture and serum vaccination, the pigs that had temperatures of 105 F. or above, particularly the 3 with generalized infection, had individual biological variability of response. This individuality of response is important when considering the safety of the vaccination procedures.

Although 2 of the 11 pen contact pigs were completely immune, these 2 pigs were in contact with pigs that were given only the culture vaccine. The 9 that were susceptible and had generalized infection, were in contact with pigs that were given both serum and culture.

The 2 litter controls that were found to be immune after percutaneous exposure must have become infected after the experimental pigs were vaccinated. Their dams and littermates used as contact controls were susceptible to infection by percutaneous exposure. Other littermates given culture vaccine were susceptible, judging by cutaneous reaction at the site of inoculation. The manner in which the primary infection occurred is not known. Fly control through use of residual and direct sprays, although not ideal, was good considering the many portals of entry. Animal caretakers did not enter the 2 pens of litter controls until after the postinoculation observations were completed. Containers of strong lye solution for dipping the boots were used before and after entering each pen of pigs and each barn.

In the culture control group, the pig that died on postinoculation day 52 had an unusual clinical course of infection. Signs of acute infection followed vaccination; although its temperature returned to normal and the cutaneous lesions disappeared, the pig never physically recovered. It did not grow and gradually became more weak and emaciated. At necropsy, an acute septicemic infection was evident by the appearance of many lymph nodes; however, a large fibrinous mass attached to the area of the tricuspid valve of the heart was indicative of a chronic infection. *Erysipelothrix rhusiopathiae* was isolated from 5 body organs, 4 joints, and the fibrinous mass in the heart. From colonies, too numerous to count, on the beef infusion agar slants that were inoculated directly from the tissues, one would have judged that the

pig died during the course of an acute infection and not several weeks after exposure.

Summary

Three different concentrations of ARS standard lot 10 anti-swine erysipelas serum, when tested in mice, had decreasing potency as indicated by the ascending median effective doses (ED-50). The 3 lots of serum were used in the simultaneous culture and serum vaccination of weanling pigs farrowed by susceptible dams. On a group basis, the experimental results did not indicate an approach to the minimal level of serum potency. On an individual basis, however, the minimal level was believed to be demonstrated in several pigs.

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Pregnancy Reduces Resistance to Brucella Organisms

In cattle, a relationship between pregnancy and susceptibility to brucellosis was reported at the 60th annual meeting of the Society of American Bacteriologists.

Blood serum from normal calves and unbred heifers has the ability to kill *Brucella abortus*. This ability is lost when the cattle are bred and begin to produce chorionic gonadotropin.

The loss of resistance which occurs between the second and sixth months of pregnancy is believed to be influenced by the magnesium level in the serum. Adding magnesium to blood serum lowered killing ability *in vitro*. Injection of magnesium salts into animals either partially or completely restored the lethal mechanism in the blood serum.

It is theorized that brucellosis in a herd could be controlled if the periods of greatly reduced resistance could be plotted.—*Lab World, 11, (Aug., 1960): 656.*

Nitrate in the Diet of Pregnant Ewes

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SHEEP AND CATTLE losses due to nitrate poisoning have been reported in Wyoming and elsewhere.[1,3,11,22] Earlier work[1] established 1.5 per cent potassium nitrate (KNO_3) as a possible low concentration in hay which would cause intoxication in cattle. However, it was not established how safe it would be to use forage with lesser amounts of nitrate. Since adverse effects have been reported in sheep and cattle from feeding hay containing sublethal amounts of nitrate,[1,3,7,19] feeding tests are necessary to determine the amounts of nitrate that will cause these sublethal effects.

Literature Review

Sheep have been poisoned by the nitrate in oat hay,[3] well water,[2] extracts of oat hay and oat straw,[3] Tribulus sp.,[17] rye grass-clover pasture,[11] and nitrate solutions.[4,10,16-18] However, the occurrence of nitrate in plants is common,[7, 8, 13, 21, 23] and hence the presence of nitrate in the rumen must be considered as a natural phenomenon.[10]

Metabolic disorders have been observed[11] in sheep grazing pastures with variable nitrate content. Low values of acetic acid in the rumen were found in sheep making poor growth on rye grass-clover pasture (0.18 to 9.28% KNO_3 in the dry plant). Similar low values of acetic acid in the rumen (with compensating increases in propionic and butyric acids) were produced in sheep by adding nitrate to their diet. A hemolytic anemia was also found in some sheep on the rye-grass-clover pasture.

The main toxic effect of nitrate is produced when large amounts of nitrite are formed in the rumen by the reducing action of the rumen microflora[14, 15, 18] and by reducing substances in the ingested plant material.[10, 17]

In the blood, the nitrite reacts with hemoglobin, producing methemoglobin (MHb), which does not furnish oxygen to the tissues. A MHb concentration of 85 per cent in sheep produces a state of mild coma.[20] A MHb concentration of 80 per cent may be lethal to a resting animal although a transient concentration of 85 per cent may be tolerated. In an active animal, death may supervene at a concentration of 50 to 60 per cent or less.

High levels of nitrate have been fed to sheep without harmful effects.[4,10] Six sheep were fed poor quality hay with 12 per cent molasses and 4 per cent $NaNO_3$ (sodium nitrate) added for 6 weeks. These sheep maintained their body weight during this period while a group on hay and molasses alone (not a maintenance ration) lost weight. The lack of toxic effects in these sheep, even with 4 per cent $NaNO_3$ in the ration was attributed to the simultaneous high intake of sugar.

Materials and Methods

Since diets containing more than 0.5 per cent KNO_3 have been reported[3, 7, 19, 21] to cause adverse effects in cattle and 1.5 per cent could approximate a lethal dose,[1] amounts of nitrate in the 0.5 to 1.5 per cent range were used.

Twelve bred ewes were allotted at random to 2 groups of 6 each.

The 6 ewes on the control diet were given 59 bales of oat hay with an average KNO_3 content of 0.21 per cent.* After 96 days, they were fed alfalfa pellets containing 0.2 per cent KNO_3 for an additional 32 days.

The 6 ewes on the high KNO_3 ration** were fed 60 bales of oat hay with an average KNO_3 content of 0.8 per cent*** over a period of 96 days. These sheep (with lambs) were then fed alfalfa pellets

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*There were 12 bales with less than 0.1 per cent KNO_3, 16 with 0.1 to 0.2 per cent, 18 with 0.21 to 0.3 per cent, and 13 with 0.31 to 0.48 per cent. Hays and pellets were analyzed for nitrate by a phenoldisulfonic acid method[7] and the NO_3 calculated as KNO_3.

**The oat hay was of good quality; 10 bales sampled at random contained 7.9 to 13.0 per cent crude protein (av. 11.25%). The commercial alfalfa pellets used contained at least 17 per cent crude protein.

containing 1.2 per cent KNO_3 for an additional 32 days.†

The sheep in both groups consumed a greater proportion of leaves and heads than stems. The residual stems had a higher nitrate content than the hay.‡

All sheep were weighed at the start and end of the feeding period. Three MHb determinations§ were made on each sheep during the experiment. Blood samples were taken first from the controls at each sampling.

Results

The 6 sheep on the high-nitrate diet averaged 128.8 lb. at the start of the experiment and 122 lb. at the end of the experiment. The controls (low-nitrate diet) averaged 144.6 lb. at the start of the experiment and 141.4 lb. at the end. Under the conditions of the experiment, there was no significant effect of the high-nitrate diet on the weight of the sheep.

Nine lambs were born to the high-nitrate group. The last 2 lambs born (not twins) had difficulty nursing because of interference by older lambs and were killed. The remaining 7 had an average weight of 24.1 lb. when the experiment was terminated.

Five lambs were born to the low-nitrate group. The average weight of the 5 was 29 lb. at the end of the experiment.

There were no abortions in either group. All lambs were in good condition when born. Three sets of twins were born to the high-nitrate group and none to the low nitrate group. The greater average weight of the lambs in the low-nitrate group was probably due to the absence of twins in that group. It was concluded that the high nitrate in the diet apparently had no adverse effect on pregnancies or on the growth of the lambs.

Blood samples were collected on experimental days 69, 99, and 128 (last day). The average percentage of MHb (% of total blood pigment) in the high-nitrate group was 5.8, 6.2, and 6.2, corresponding to 0.68, 0.73, and 0.73 Gm. of MHb/100 ml. of blood for the 3 collections respectively. In the low-nitrate group, the percentage of MHb was 7.3, 5.0, and 6.5, corresponding to 0.85, 0.58, and 0.76 Gm. of MHb/100 ml. of blood. The differences were not statistically significant at the 1 per cent level.

In making the MHb determination, it was found that the photometer reading should be taken as specified, 5 minutes after making the dilution, because the value continues to increase with time, resulting in increasing values for the MHb content (table 1).

TABLE 1—Grams of Methemoglobin per 100 ml. of Blood

Time after dilution (min.)	Gm. MHb/ 100 ml. blood
5	0.74
10	0.81
20	1.00
35	1.40
65	2.15

The decrease in MHb between the time the blood was drawn and the time the analyses were made (30 min. to 1 hr.) is not definitely known. Examination of a blood sample with high MHb content gave the results shown (table 2).

TABLE 2—Grams of Methemoglobin per 100 ml. of Blood

Time after sampling	Gm. MHb/ 100 ml. blood
30 min.	4.1
2 hr. (in refrigerator)	3.4
24 hr. (in refrigerator)	3.2

Discussion

During the oat hay feeding period, the sheep on the high nitrate hay were given, on the average, about 12 Gm./cwt. of KNO_3 daily. While on the 1.2 per cent KNO_3 pellet diet, they were given about 17.6 Gm./cwt. of KNO_3 daily.

The effect of the nitrate was probably much less than it would have been from an equal amount given in one dose by stomach tube. Disturbances (especially in cattle) such as abortion, lowered milk pro-

***Eleven bales contained 0.3 to 0.5 per cent KNO_3, 32 bales 0.51 to 0.99 per cent, 16 bales 1.01 to 1.53 per cent, and 1 bale 2 per cent. The hay was sampled by using a wool corer. A core of hay about 2½ inches in diameter and about 15 inches long was obtained from the ends of the bales.

†The commercial dehydrated alfalfa pellets used contained 0.2 per cent KNO_3. One per cent KNO_3 was added to the pellets by sprinkling with a solution of KNO_3 and air drying.

‡The average KNO_3 content of 8 bales (from which the residual stems were tested) was 0.98 per cent and the average amount in the stems was 1.45 per cent.

§The methemoglobin was determined by the method of Evelyn and Malloy.[5]

duction, low plasma vitamin A, and conditions similar to laminitis have been reported[3] from ingestion of feeds of much lower nitrate content.

The good quality of the rations used was probably a factor in reducing the toxicity of the nitrate, since previous workers[10,18] have demonstrated that the capacity of the rumen to detoxify nitrate is reduced when animals are fed poor quality rations.

The decrease in the MHb content of the blood on standing has previously been observed. When blood was allowed to stand at room temperature,[9] 30 to 50 per cent of the MHb reverted to hemoglobin in the first 2 hours; the remainder was converted at a gradually decreasing rate. Hence, the MHb determination should be made as soon as possible after drawing the blood sample from the animal.

Because of variations in the amount of nitrate in hay from different parts of a field, it is difficult to obtain a representative sample for testing of nitrate content.

Summary

Feeding oat hay containing an average of 0.8 per cent potassium nitrate (KNO_3) to sheep during pregnancy had no harmful effects on weight of adult sheep or on lambs born during the feeding period. Feeding alfalfa pellets containing 1.2 per cent KNO_3 had no harmful effects when fed to sheep from the start of lambing period until lambs were 2 to 4 weeks old.

There was no significant difference in the methemoglobin (MHb) content of the blood of sheep fed good-quality oat hay containing 0.21 per cent KNO_3, and that of sheep fed oat hay containing 0.80 per cent. There was also no significant difference in the MHb content in sheep fed alfalfa pellets containing 0.2 and 1.2 per cent KNO_3.

The MHb determinations should be made as soon as possible after the blood sample has been obtained, especially when there is a high MHb content, because there was a loss of MHb of about 22 per cent in samples with high MHb content, as a result of allowing samples to stand in the refrigerator for 24 hours.

The potassium nitrate content of oat hay (from a single stack) varied from 0 to 2 per cent. This variation makes it difficult to make any recommendations as to the safety of using any lot of oat hay or straw for livestock feeding unless it is carefully and adequately sampled.

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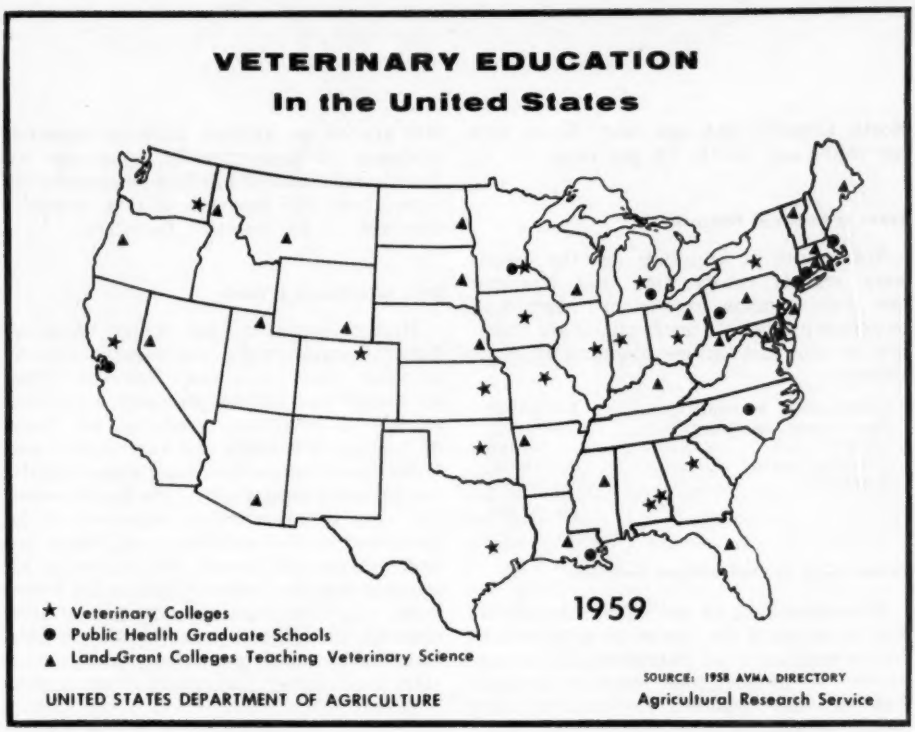
Bordetella Commonly Infects Animals

Bordetella bronchiseptica is a common inhabitant of the respiratory tract and the middle ear of a variety of wild, domestic, and laboratory animals in which it can induce a carrier state or can cause overt illness. A lowered resistance of the animal may upset the balance of the carrier state. Rather than attempt to eliminate the organism from a laboratory animal colony by means of vaccination or antibiotics, one should produce a "free" colony and prevent the introduction of *B. bronchiseptica* by rigid measures of isolation and high standards of hygiene.—*Johan Winsser, Proc. Animal Care Panel, 10, (1960): 87.*

Hepatotoxin Causes Liver Damage in Facial Eczema of Sheep

Facial eczema is a serious disease affecting sheep and cattle in many areas in New Zealand. The disease is essentially an acute cholangitis which, in more severe cases, is accompanied by obliteration of medium-sized bile ducts, with bile ductule proliferation, and a gradual replacement of liver parenchyma in the portal areas with fibrous tissue as the lesions become more extensive. It has recently been shown that this condition is due to a toxic principle present in the fungus *Sporidesmium bakeri*, Syd., a saprophytic organism growing in association with pasture.

The fact that toxin has been detected in bile suggests that in the intact animal an enterohepatic circulation of toxic material may occur. This fact might assist in explaining the "progressive" nature of the disease and the fact that such seemingly minute traces of toxin are capable of producing, in many cases, lesions of the most severe form.—*Nature, 185, (March 26, 1960): 909.*



College Construction

to Benefit Education

in Veterinary Medicine

John B. RORK, B.S., M.B.A.

NEW DETAILS of construction plans of institutions of higher learning are emerging from the continuing analyses of data gathered by the Office of Education for its college and university facilities survey. Analysis of some of the latest material indicates that schools of veterinary medicine expected to invest more than $16 million in the construction of physical facilities during the 7-year period, 1956-1962.

In two geographic regions, the South and the West, cooperative plans have been developed which permit states without schools for veterinary education to send a limited number of students to neighboring states, and to pay a fee for the privilege. These interstate compacts were established in part to avoid the immediate creation of duplicating professional and graduate school facilities, thus saving an outlay of capital funds and yet permitting individual states to provide such training for its youth. The extent to which regional compacts may have reduced planned capital expenditures for physical facilities for veterinary education for the 1956-1962 period cannot be determined from the current study; however, by geographic regions, the percentage distribution of the proposed capital outlay is: Northeast, 40.9 per cent;

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North Central, 33.6 per cent; West, 17.9 per cent; and South, 7.6 per cent.

Types of Buildings Planned

What kind of buildings are the veterinary schools constructing and planning for their campus expansions? According to primary function, the facilities are classified by the institutions planning them as follows:

Instructional, academic	$ 8,365,000
Instructional, laboratory	4,000,000
Library	500,000
Teaching hospital	1,500,000
Research	1,902,000
	$16,267,000

Expenditures for Instructional Facilities

Thus classified, 76 per cent of the funds are to be spent for instructional facilities in the usual sense of classrooms and laboratories. If library and teaching hospital facilities are included, instructional uses would be slightly more than 88 per cent.

Expenditures for Research Facilities

Research facilities will cost about 12 per cent of the $16,267,000 on the basis of primary function only. Unless a further analysis is made of the secondary function of the facility, the 12 per cent figure fails to indicate the emphasis being placed on research facilities.

Reporting institutions indicated a second function for any building planned to serve approximately equally two functions. Of the buildings designated to serve primarily the instructional function, (academic and laboratory), those estimated to cost $7,650,000 are to be utilized also for research purposes. If approximately equal use by function is assumed for dual purpose buildings, about 33.5 per cent of total expenditure will be for research facilities.

State as a Source of Funds

Higher education has many bases of financial support for the construction of physical plant facilities. However, since all except two of the presently accredited schools of veterinary medicine are parts of land-grant colleges and universities, and these exceptions receive some state support, a substantial proportion of the funds needed for new construction is expected to be furnished by the various states. State appropriations will provide 85 per cent of all construction funds for buildings for veterinary medicine for the 7-year period 1956 through 1962. The remaining 15 per cent is being obtained from state taxes (8%), state bond issues (4%), and other sources (3%).

Comparison with Construction for Other Medical Arts

Data not published here indicate that colleges and universities planned to spend slightly more than $405 million for buildings for higher education in the other medical arts during the period 1956-1962.

The distribution of this sum is: medicine (man), $380 million; dentistry, $15 million; and nursing, $10 million. Thus, on the basis of funds allocated for physical facilities for the period 1956-1962, veterinary medicine is receiving 4.3 per cent as much as medicine (man), 6.7 per cent more than dentistry, and 60.0 per cent more than nursing.

Toxascaris leonina of Dog and Cat Considered One Strain

Toxascaris leonina was found to occur in a large range of feline and canine hosts. Both cats and dogs were infected when fed eggs containing second stage larvae and tissues containing third-stage larvae from infected mice. Since both the feline and canine strains grew to the adult stage in both cats and dogs, it was concluded that the canine and feline strains constitute a single species.—*Vet. Bull., 30, (June, 1960): 332; abstr. from Parasitology, 49, (1959): 330.*

Editorial

The World Veterinary Force

In the world today, there are about 175,000 veterinarians. This figure is based on a survey reported in the 1959 *FAO Animal Health Yearbook*.[1] In this survey, 147,918 veterinarians were accounted for, but veterinarians from several countries, such as China, Mexico, Argentina, Iran, Hungary, Czechoslovakia, Romania, Bulgaria, and Algeria, which may have significant numbers of veterinarians, were not included. About 27,000 veterinarians are estimated for these countries.

According to the survey, the U.S.S.R. has the greatest number of veterinarians, 42,040; the United States, the second greatest number, 20,100; and Japan, the third greatest number, 18,375. The 20 countries with the largest veterinary populations are listed in table 1.

Some of the figures for veterinary populations reported in the survey may be inaccurate because definitions or qualifications of a veterinarian vary among the different countries. In the United States, for example, a small number of veterinarians have achieved the status of veterinarian by legislative statute rather than by educational qualifications and examinations for professional fitness. These individuals may not be considered veterinarians according to some standards of classification and, consequently, the United States' veterinary population figure reported may be slightly inaccurate. In Japan, the majority of veterinarians have no more than a high school education in which veterinary science was emphasized.[3] A relatively small percentage would be considered veterinarians by standards adopted in the United States; consequently, the reported veterinary population figure for Japan cannot be compared accurately with the U.S. figure.

TABLE 1—World's 20 Leading Countries in Veterinary Population

U.S.S.R.	42,040	Brazil	2,890
United States	20,100	Yugoslavia	1,795
Japan	18,375	Denmark	1,668
Germany (Fed. Rep.)	8,297	Austria	1,601
Spain	7,525	Korea	1,383
Italy	7,400	Netherlands	1,242
France	4,489	Pakistan	1,080
United Kingdom	4,316	Turkey	1,042
Poland	3,735	Belgium	986
India	3,600	Switzerland	923

The accuracy of the figure for the Soviet Union is difficult to assess, but a comprehensive report by a technical study group in the ARS has given us a relatively good idea of that country's veterinary activities.[2] According to this report, current requirements for professional qualification in veterinary medicine in the U.S.S.R. are similar to ours. However, we do not know what percentage of their present veterinary population was educated under their present educational program. This unknown factor may affect the data significantly when numbers of veterinarians are compared. However, each year 3,500 new veterinarians are graduated from the 34 veterinary schools in the U.S.S.R., a fact which indicates that the figure may be reasonably accurate.

Most of the well-developed countries of the world have had veterinary schools for many years, and the education given their veterinarians is comparable to ours in many instances. Because of studies conducted by the AVMA Council on Education relative to accreditation status of foreign schools, we can consider the reported number of veterinarians in many of these countries to be reliable.

Some observations relating to veterinary populations and animal populations are worthy of mention. India, ranking tenth in world veterinary population, leads the

world in numbers of domesticated cattle (159 million), goats (55 million), buffaloes (45 million), and elephants (10,000), and ranks fourth in camels (800,000).

The U.S.S.R., ranking first in veterinary population, leads the world in numbers of horses (12 million) and ranks second in sheep (120 million), third in swine (44 million), and fourth in cattle (67 million).

The United States, second in veterinary population, ranks second in cattle (93 million), second in swine (50 million), seventh in horses (2 million), eighth in sheep (31 million), and eleventh in mules (1 million).

China, its veterinary population unreported, ranks first in swine (146 million), first in mules (13 million), second in goats (45 million), third in sheep (53 million), and horses (7 million), and fifth in cattle (45 million).

Japan, ranking third in veterinary population, is not reported among the leading five countries for any species of domestic livestock.—A.F.

References

[1]FAO Animal Health Yearbook 1959. Columbia University Press, International Documents Service, New York, N.Y. (1959): 178-188.

[2]Veterinary Science in the Soviet Union. U.S. Government Printing Office, Washington 25, D.C., (1959): 6-9.

[3]Yamamoto, Shutaro, University of Tokyo, Tokyo, Japan: Personal communication, Oct. 7, 1960.

Expect Marked Increases in Livestock and Poultry in 1961

Swine.—The 1960 fall pig crop is estimated to be 41,500,000 head which is 4 per cent less than the pig crop of the preceding fall.

It is estimated that approximately 54,000,000 pigs will be produced in the spring of 1961, which is 10 per cent more than the 49,103,000 produced in the spring of 1960.

It is expected that the average slaughter weight of all hogs marketed (including sows) in the 1960-1961 feeding year will be 237 lb., which is 1 lb. more than last year's (1959-1960) average.

Poultry.—The average number of layers for the feed year beginning Oct. 1, 1960, will be approximately 285,000,000, which is a 4 per cent decrease from the previous year.

The number of chickens raised for replacement purposes during the calendar year 1961 is expected to increase by 10 per cent for a total of 373,000,000.

Commercial broiler production for the calendar year 1961 will total 1,925,000,000. This is an increase of 7 per cent over 1960.

It is predicted that 88,000,000 turkeys will be raised during 1961, which represents a 7 per cent increase over 1960.

Dairy Cattle.—The number of cows to be milked in 1961 is expected to be 19,400,000. The downtrend in cow numbers has leveled and it appears that there may be a slight upturn in 1961.

The number of heifers 1 to 2 years old is expected to increase about 2½ per cent over 1960, and the number of heifer calves under 1 year old is expected to increase approximately 4 per cent.

Total milk production of 127.1 billion pounds expected in 1961 is an increase of more than 1 per cent over 1960 and is the result of an increase in cow numbers coupled with a 1 per cent increase in yield per cow.

Beef Cattle.—Beef cattle numbers are expected to increase 4 per cent during 1961. Cattle slaughter is expected to increase by 5 to 10 per cent over 1960 in the year ahead. Of the 27 million cattle expected to be slaughtered in 1961, 14 million head will be grain-fed steers and heifers.

Sheep.—The total number of sheep and lambs is expected to increase between 1 and 2 per cent.

Horses.—A 2 per cent reduction in number of horses and mules is expected for the 1960-1961 feeding year. The increase in light horses and pleasure ponies will nearly offset the continued decline in work stock.—*Am. Feed Manufacturers Assoc. Release, Oct. 28, 1960.*

from the *Research Journal*

Pathology of a Low Virulence Ornithosis Virus for Turkeys

Exposure of turkeys, 2 weeks old or more, resulted in a subclinical infection in turkeys exposed by the intraperitoneal, intratracheal, and intranasal routes. Distinct pathologic lesions, similar to those caused by virulent strains, were found. The most extensive lesions were found in the lungs, air sacs, and pericardium. The lungs had areas of consolidation, congestion, and edema; the air sacs were thickened and edematous. Cellular exudate was frequently observed in the heart sac. The microscopic changes associated with the lesions are described; marked cellular infiltration with edema and congestion were the most common findings.—[*G. Gale, V. L. Sanger, and B. S. Pomeroy. The Gross and Microscopic Pathology of an Ornithosis Virus of Low Virulence for Turkeys. Am. J. Vet. Res., 21, (May, 1960): 491-497.*]

Serum Protein Changes in Anaplasmosis

Studies of serum proteins in experimentally infected splenectomized calves showed that the absolute concentrations of all serum proteins decreased prior to the appearance of Anaplasma bodies. Increases in the total serum proteins, *alpha* and *beta* globulins, and total globulins were paralleled by a peak in the Anaplasma body count. The concentration of *gamma* globulin was low at this time. The albumin/globulin ratio and the concentration of total serum proteins decreased to their lowest values as the number of Anaplasma bodies decreased. As the levels of *alpha* and *beta* globulins returned to preinfection values the concentration of *gamma* globulin began to increase.—[*G. T. Dimopoullos, G. T. Schrader, and L. E. Foote: Electrophoretic Studies of Bovine Serum. III. Serum Protein Changes in Anaplasmosis. Am. J. Vet. Res.,* 21, (*March,* 1960): 222-225.]

Serum Protein Changes in Parasitized Lambs

Observations were made on lambs heavily parasitized (mixed infections, principally Haemonchus), moderately parasitized, and nonparasitized, and on nonparasitized lambs with artificially induced anemia, to detect possible changes occurring in total serum proteins and serum protein fractions as measured by paper electrophoresis. Significant changes in serum protein occurred in both the heavily parasitized lambs and in the moderately parasitized lambs when compared to nonparasitized controls. Serum changes in moderately parasitized lambs were less definite than in those with heavy parasitism. In heavily parasitized lambs, the total serum protein was decreased; albumin fraction was decreased; and *alpha*-1 globulin, *alpha*-2 globulin, *beta*-globulin, and *gamma*-globulin fractions were increased. Similar changes, although less severe, occurred in serum protein of nonparasitized lambs with induced anemia. A significant increase in the *alpha*-2 globulin and significant decrease in the albumin occurred in heavily parasitized lambs, as compared to the nonparasitized lambs with comparable induced anemia.—[*K. L. Kuttler and D. W. Marble: Serum Protein Changes with Naturally Acquired Nematode Infections. Am. J. Vet. Res., 21, (May, 1960): 445-448.*]

Pox Disease in Monkeys

A poxlike disease was observed in a monkey colony, involving *Macaca philippensis*. The epizootiology of the disease within the colony was observed, and the incidence of clinical disease recorded. Although *Macaca mulatta* and *Cercopithecus aethiops* var. *sabaeus* were housed in the colony, no clinical disease was observed in these species. The pathologic changes, both gross and microscopic, of tissues from naturally affected animals were studied in detail. The most significant finding was the presence of intranuclear and intracytoplasmic inclusion bodies, closely resembling those produced by the variola vaccinia groups of viruses. Other lesions were consistent with changes produced by this group of viruses.—[*R. M. Sauer, J. E. Prier, R. S. Buchanan, A. A. Creamer, and H. C. Fegley: Studies on a Pox Disease of Monkeys. I. Pathology. Am. J. Vet. Res., 21, (May, 1960): 377-380.*]

Effects of Preanesthesia in Cats

The preanesthetic administration of meperidine (11 mg./kg.), promazine (4.4 mg./kg.), promethazine (8.8 mg./kg.), meperidine (11 mg./kg.), and promazine (4.4 mg./kg.); or meperidine (11 mg./kg.) and promethazine (8.8 mg./kg.) prior to pentobarbital anesthesia did not consistently improve the blood pressure, oxygen consumption, packed cell volume, blood volume, circulation time, heart rate, or respiratory rate of cats subjected to 30 minutes of intestinal manipulation.

Preanesthetic administration of either meperidine and promazine or meperidine and promethazine did significantly reduce the subsequent anesthetic dose of pentobarbital. When meperidine was administered prior to pentobarbital, the oxygen consumption was remarkably reduced 4 hours after intestinal manipulation; the heart rate was elevated before the trauma was produced. With promazine-pentobarbital anesthesia, the oxygen consumption was also significantly reduced 4 hours after intestional manipulation; the respiratory rate following anesthetization increased. Neither the oxygen consumption, heart rate, or respiratory rate were significantly changed when meperidine and promazine were administered together.

Promethazine produced a notable increase in the blood pressure 4 hours after trauma, and the respiratory rate was also increased prior to the traumatic procedure. Neither of these functions were significant at the 1 per cent level when meperidine and promethazine were administered concomitantly, although a similar trend was apparent in both instances.—[*D. H. Clifford: Effects of Meperidine, Promazine, and Promethazine Preanesthesia on Traumatic Shock and Experimental Pentobarbital Anesthesia in Cats. Am. J. Vet. Res., 21, (July, 1960): 557-563.*]

Tests for Abnormalities in Milk

A simple technique for determination of catalase in mixed herd milk was tested. This technique gave consistent results in replicate tests. The presence of catalase in milk was correlated with high body cell counts and the California mastitis test reaction, although the values were not uniformly parallel. The catalase test was compared with the California mastitis test, and the latter was found to be superior as a barn test on quarter samples where immediate results are required. For quality control tests on mixed herd milk, the catalase test is considered superior to the Breed count and the California mastitis test. No single test or combination of the 3 tests was a reliable indicator of the presence of bacterial infection in milk samples from individual quarters.—[*G. R. Spencer and J. Simon: The Catalase, California, and Cell Count Tests for Detecting Abnormalities in Milk. Am. J. Vet. Res., 21, (July, 1960): 578-584.*]

Granular Structures in Brains of Dogs

In a preliminary survey of 30 dogs that were at least 4 years of age, spherical, eosinophilic, granular structures were found in the medullae of 12 (40%). They occurred less frequently in other sites of the brain and spinal cord and were seldom found in dogs less than 1 year of age. On the basis of a critical study by various histologic and histochemical methods, the structures were considered to be degenerating axis cylinders.

These degenerating axis cylinders in the dog were compared with published descriptions of lesions associated with a variety of diseases or conditions manifested in the central nervous system in man or dogs, or both. They were found to have no similarity to the lesions associated with pellegra; sprue; Wernicke's syndrome; anoxia; carbon monoxide poisoning; chronic heavy-metal intoxication; presenile or senile cerebral disease; and various bacterial, fungal, viral, and protozoal infections. They are identical with the structures reported as degenerating axis cylinders in man (principally in older people), but which apparently are not related to any specific neurologic or pathologic entity.

The absence of clinical signs and significant histologic changes in other areas of the central nervous system, together with an apparent increase in number with age, suggests that these degenerating axis cylinders in the dog probably are a nonspecific defect of aging and apparently are not associated with any specific disease or neurologic change.—[*J. W. Newberne, V. B. Robinson, L. Estill, and D. C. Brinkman: Granular Structures in Brains of Apparently Normal Dogs. Am. J. Vet. Res., 21, (Sept., 1960): 782-786.*]

Mycobacterium Vaccination in Cattle

Eight calves were vaccinated intradermally with a 0.1-ml. dose of killed *Mycobacterium paratuberculosis* and 8 were given a 0.3-ml. dose. Nodules which developed at the vaccination site were removed from half of the animals in each group. All cattle were tested with johnin and tuberculin intradermally in both the cervical region and the caudal folds at intervals during a 22-month period. The size of the vaccinal dose or the removal of the nodule had little effect on the degree of sensitivity or the rate at which it was lost. Johnin reactions were larger than tuberculin reactions in both the caudal folds and the cervical region in 160 of a total of 204 tests. Six cattle, vaccinated with *Myco. paratuberculosis* and subsequently vaccinated with killed *Mycobacterium tuberculosis* var. *bovis*, had larger tuberculin than johnin reactions in 3 out of 6 caudal fold tests and in 5 out of 6 tests in the cervical region.—[*A. B. Larsen and T. H. Vardaman: Allergy Studies on Cattle Vaccinated with Killed Mycobacterium paratuberculosis. Am. J. Vet. Res., 21, (Sept., 1960): 744-747.*]

Paper Electrophoresis of Goat Serums

A study of serum proteins of goats, 24 to 30 months of age, was conducted for comparison with similiar studies of goats 7 to 9 months old. Moderate to marked differences were found in mean total protein and protein component concentrations of goats in the 2 age groups. Goats of the older group had increased total protein, *beta*-2 globulin, and *gamma*-globulin levels and markedly decreased albumin concentration. Also noticed in some goats was an *alpha*-2 globulin and an increased incidence of the *beta*-2 globulin which had limited appearance in the younger goats. Significant variations, based upon location and breed, were seen in the older goats studied. The wide range of normal values previously encountered in younger animals was also present in the older goats.—[*L. R. Gorczyca, R. T. McCarty, and J. A. Lazaroni: Further Studies of Goat Serum Proteins by Paper Electrophoresis. Am. J. Vet. Res., 21, (Sept., 1960): 851-855.*]

New Books

Animal Health Yearbook 1959

"Animal Health Yearbook 1959," issued by the Food and Agriculture Organization of the United Nations in cooperation with the International Office of Epizootics, has now reached its fourth annual edition and is a source of reference on the incidence and distribution of livestock diseases throughout the world.

The publication, which is produced by the World Livestock Disease Reporting Service at FAO Headquarters, Rome, Italy, contains information on over 250 diseases in more than 120 countries. In addition, there are a few articles by well-informed authorities on matters of current veterinary interest, with maps illustrating the present status of certain epizootic diseases.

Valuable recent additions to the contents are figures on livestock populations, in each of the countries concerned, together with information on veterinary services.—[*Animal Health Yearbook 1959. Food and Agriculture Organization of the United Nations. 249 pages. World Livestock Disease Reporting Service, FAO, Rome, Italy. Available from Columbia University Press, 2960 Broadway, New York 27, N.Y. 1960. Price $2.50.*]

Transplantable and Transmissible Tumors of Animals

This fascicle is a comprehensive review of all important, currently known transplantable and transmissible tumors. Fifty different tumors have been selected representing 30 in mice, 10 in rats, 3 in rabbits, 2 in chickens, 2 in dogs, and 1 in the hamster, guinea pig, and frog. Each tumor has a description of its history, pathology, and biological behavior. All the pertinent references are listed after the description of each neoplasm. It is noteworthy that the first successful transplant of a tumor is credited to a Russian veterinarian back in 1878. The gross and histopathologic illustrations (4 color plates and 287 black and white) are of excellent quality as they are in all of the fascicles from the Armed Forces Institute of Pathology. The book is a most valuable contribution to the field of oncology and is indispensable to any worker in cancer research.—[*Transplantable and Transmissible Tumors of Animals. By Harold L. Stewart, Katharine C. Snell, Lucia J. Dunham, and Samuel M. Schlyen. 378 pages; illustrated. Armed Forces Institute of Pathology, Washington, D.C. 1960. No price indicated.*]—S. W. Nielsen.

Handbook of Microbiology

Arranged in a series of 38 tables, this handbook provides data needed for professional work in modern microbiology, from routine testing to fundamental research. It has been designed to meet the needs of those interested in this science: bacteriologists, biologists, serologists, immunologists, mycologists, sanitarians, physicians, public health scientists, chemists, and others.

The first table gives the characteristics of microorganisms—their cellular, cultural, physiologic, and biochemical characteristics, their taxonomy and pathogenicity, and their industrial and research utilization—all of which can be seen at a glance because of the tabular arrangement. However, a few organisms important in veterinary medicine are not listed. Other tables present the classification of bacteria and fungi, the distinguishing characteristics and differentiation of groups of bacteria, and bacterial, rickettsial, and viral diseases. Information is tabulated on toxins, antitoxins, and vaccines and on antibiotics. Methods on culture mediums and culturing, microbiological reagents and tests, stains and staining, testing disinfectants, and phenol coefficients are given in detail. Tables of temperature conversions, saturated steam temperatures, pH indicators, and buffer solutions are included also, and particular emphasis has been placed on the biochemical and chemical aspects were applicable.—[*Handbook of Microbiology. By Morris B. Jacobs and Maurice J. Gerstein. 332 pages. D. Van Nostrand Co., Inc., Princeton, N. J. 1960. Price $8.50.*]

News

"There is no greater common denominator between the peoples of the world than the field of health . . ."

This is a quote from the comments made by United States Surgeon General Dr. LeRoy Burney at the dedication ceremonies of Purdue University's new School of Veterinary Science and Medicine, October 12, at Lafayette, Ind.

Dr. Burney also said, "We should dedicate this school to the peoples of the whole world as a contribution to real understanding and peace with honor throughout the world."

The $6 million school was dedicated before a crowd of 700 persons by Indiana's Governor Harold W. Handley, who called the facility a national as well as a state achievement. He said the school is a long overdue project vital to public health and the Indiana livestock industry.

Some officials at the dedication of the new Purdue University School of Veterinary Science and Medicine pose before the ceremonies. Left to right are Dr. R. B. Stewart, vice-president and treasurer of the University; Dr. Earl L. Butz, dean of the School of Agriculture; Dr. L. Burney, U.S. Surgeon General; Dr. Frederick L. Hovde, president of the University; Governor Harold W. Handley; Dr. Erskine V. Morse, dean of the new school; Hassil Schenck, Lubanon, Purdue trustee and past-president of the Indiana Farm Bureau; and Walter Scholer, Lafayette, Walter Scholer & Associates, architects for the veterinary school structures.

Four departments are housed in the new veterinary science buildings at Purdue. They are anatomy, physiology and pharmacology, microbiology, pathology and public health, and clinics. The facilities also include a metabolic disease unit, a building for study of reproductive problems in cattle, a unit for the housing and production of laboratory animals, and a feed-storage building. Many isolation units, an animal disease diagnostic laboratory, and a 360-acre research farm have been provided. Research and instructional equipment include closed-circuit television throughout the school and an electron microscope laboratory in the Department of Veterinary Anatomy.

Also speaking at the dedication ceremonies were: Drs. Eldon E. Leasure, president of the AVMA and dean of the Kansas State University School of Veterinary Medicine; Harry J. Magrane, president, Indiana Veterinary Medical Association; Frederick L. Hovde, president, Purdue University; and Erskine V. Morse, dean of Purdue's new School of Veterinary Science and Medicine.

The first two classes of veterinary students are now studying in the new facilities. The first class will be graduated in 1963. Each department of the school offers graduate programs leading to M.S. and Ph.D. degrees.

A three-day conference for veterinarians was held in conjunction with the dedication of the school.

Mrs. Charles J. Lynn, Indianapolis, widow of the Purdue University trustee for whom the basic science building of the new Purdue School of Veterinary Science and Medicine was named, views portrait of her husband in the foyer of the building. With her is Dr. Erskine V. Morse.

Research Center for Zoonoses Open

The only research center for zoonoses in the United States opened at the University of Illinois last September.

The University of Illinois center, the second in the world, is directed by Dean Carl Brandly, College of Veterinary Medicine. It provides facilities for attacks on diseases of animals and man by veterinarians, medical doctors, biologists, and climatologists.

The broad relationship of animal diseases to human health and the increasing application of veterinary medicine in the exploration, identification, and solution of human health problems, provides basis for the comparative medical studies to be carried on at the center. Knowledge pertaining to animal disease, animal pathology, animal nutrition, animal senescence, and even animal psychology can, through research, be applied more and more to the study of the physical and mental health of man. The research center will provide greater opportunities for understanding and application of the comparative medicines.

Initial studies at the center will be limited to diseases common to man, livestock, and wildlife and the transmittal of diseases between man and his pets.

In seeking the best guidance and counsel toward developing a strong and productive center, the University of Illinois invited a group of authorities in areas related to zoonoses to participate in a conference September 28-29. Topics discussed at the conference were thresholds and needs of zoonoses research, public consciousness of the zoonoses, and the allied medical team attack on studying zoonoses. Physicians, veterinarians, and men working in other areas of medicine and science participated in the conference.

Arrangements Under Way for AVMA 1961 Meeting

The Executive Committee on Local Arrangements met for the first time in Detroit, October 6-7, to lay plans for AVMA's 98th annual convention. The convention will meet in Detroit, Mich., August 21-24, 1961.

The executive committee will act as a clearing house for all convention matters and appoint all other local arrangement committee members. Under its jurisdiction are such things as transportation, publicity, the golf tournament, entertainment, women's activities, and television. AVMA scientific section officers plan the scientific programs presented at the convention.

Executive committee members are: Drs. Robert Willson, executive secretary, Michigan State V.M.A.; John F. Donovan, president, Michigan State V.M.A.; G. T. McCarty, president-elect, Southeastern Michigan V.M.A.; and Leonard Schreiber, president, Southeastern Michigan V.M.A. Dr. H. E. Kingman, Jr., AVMA executive secretary, and Mr. R. G. Rongren, AVMA business manager, represented the Association at the meeting.

Also meeting with the committee was Mr. H. E. Boning, Jr., executive vice-president of the Detroit Convention and Tourist Bureau. Mr. Boning discussed convention housing and took the group on a tour through Detroit's new Cobo Hall, which will be the exhibit hall during the convention. The Sheraton-Cadillac Hotel will be the AVMA headquarters hotel.

San Francisco Veterinarians Sued by Pets Unlimited

The Association of San Francisco Veterinarians is being sued by an organization called Pets Unlimited for allegedly ruining their business by making it impossible for them to employ veterinarians.

Pets Unlimited began in 1947 as a nonprofit corporation with the purpose of placing homeless animals and the credo that no animal should be euthanatized. After operating as a shelter for several years, they opened a veterinary hospital.

Recently two of three staff veterinarians left their employ and Pets Unlimited found it difficult to replace them. Claiming that the Association of San Francisco Veterinarians threatened veterinarians with expulsion from the association if they accepted Pets Unlimited positions, they closed their hospital and instituted the lawsuit.

The Association of San Francisco Veterinarians, an informal group meeting occasionally to exchange ideas on professional and business problems, says this isn't true. They point to the fact that their present chairman was employed by Pets Unlimited

until several months ago, when he left for personal reasons. He had also served as secretary of the association at the same time he worked for Pets Unlimited. Another veterinarian associated with the Association of San Francisco Veterinarians has been and still is employed by Pets Unlimited. The association states that it has no power whatsoever to exert pressure on local veterinarians.

In a letter written to the AVMA Executive Board, the San Francisco veterinarians said they feel the laity has no business in the field of veterinary medical practice "any more than we would have if we hired attorneys to practice law, advertised their services, and promoted law business on the basis that proceeds would be used to find homes for homeless animals or any other charity.

"It is important for our colleagues to realize that this group and similar groups . . . are able to harass and malign a segment of our profession, embarrass us publicly and privately, and hold our ethical standards in contempt."

Girl Scout Cookie Packages Show Pet Care Activities

Have you taken a good look at your Girl Scout Cooky Mints package? If you have, you may have found that your package described the work girl scouts perform to earn their First Aid to Animals and Animal Raiser badges.

There was a variety of package coverings this year describing the activities of girl scouts toward earning various badges. Pet care activities were featured on one of the covers designs. This cover showed a picture of a girl scout feeding nuts to a squirrel and saying, "I think I will be an animal doctor."

From the beginning of 1948 to the end of 1959, as many as 59,365 girl scouts earned a First Aid to Animals badge. The badge is awarded to girls who have learned under the direction of a veterinarian first aid procedures and approved methods of handling sick and injured animals.

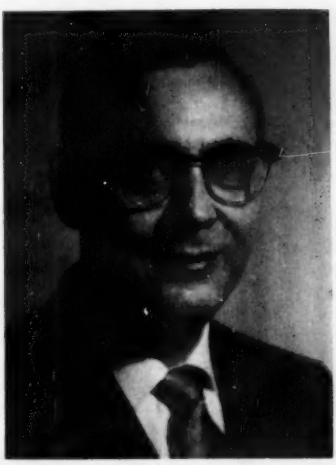
Girl scouts can earn several badges that have veterinary interest. Some of them are badges for proficiency in learning about birds, cats and dogs, reptiles and amphibians, horsemanship, mammals, poultry raising, dairying, and public health.

Dr. D. L. Coffin Receives Two Department of Health, Education and Welfare Appointments

Dr. David L. Coffin (UP '38) will serve as a member of the Pathology Study Section of the Department of Health, Education and Welfare from Sept. 1, 1960, through Sept. 30, 1964.

Dr. James A. Shannon, director of the National Institutes of Health, outlined the activities of the Pathology Study Section in his letter of invitation to Dr. Coffin as follows: "Members of the study sections provide technical advice to the National Advisory Councils of the National Institutes of Health on matters relating to the medical research affairs of the nation. This advice is channeled through the Councils to the Surgeon General of the Public Health Service.

"The study sections have the responsibility for reviewing applications for research grants in their fields and making recommendations to the advisory councils, and for surveying the status of research in their fields to determine areas where more research is needed."

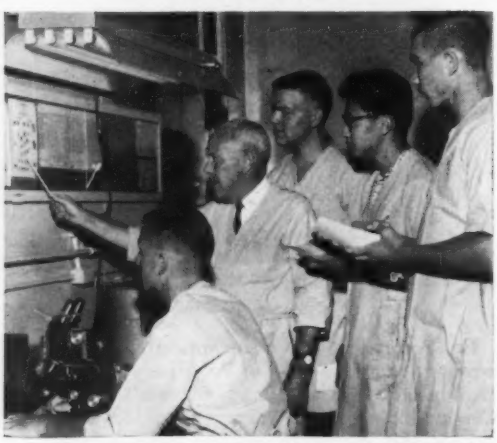


Dr. D. L. Coffin

Dr. Coffin has also been appointed to an advisory committee to the Veterinary Public Health Section of the Communicable Disease Center, Atlanta, Ga. This committee will review the subject of animal cancers and recommend to the center lines of investigation that might further undersanding of human cancers.

L. A. Page, Ph.D., School of Veterinary Medicine, University of California, Davis, demonstrates cultural characteristics of bacteria isolated from oral infections in reptiles.

Students assist L. Z. McFarland, D.V.M., School of Veterinary Medicine, University of California, Davis, in the collection of excretions from the nasal gland of a gull.



The development, morphology, and identification of leukocytes is described to students by Bernard Sheriden, San Diego Zoo hospital medical technician.

That They Might Learn

Since professions began, dedicated professional people have shared their knowledge with youngsters interested in their field. People in such professions as law, education, science, engineering, and journalism have devoted a great deal of time to the guidance and development of the professional potential young people might possess.

Perhaps the professions of health and medicine have been most active in career development, and veterinary medicine has kept pace and worked along with the other medical professions in guiding young people into the field for which they are best suited.

An example of the activities of the veterinary medical profession in career development is the veterinary work exploratory program at the San Diego Zoo. Under the guidance of the zoo veterinarian and the medical technician, four senior high school students participate in the medical activities of the zoo each semester. The students observe and learn various techniques and practices used in caring for the zoo animals. Basic laboratory diagnostic techniques and the treatment of the animals' ailments are demonstrated and, in some cases, are practiced by the students. To give them experience and insight in many fields of biological research, they are occasionally given a chance to assist biological scientists in experimental procedures at the zoo's Biological Research Institute.

The program is geared to giving them a realistic look at the tasks and requirements of these scientific professions. At the end of the course, the veterinarian and medical technician counsel each student. Observations of his performance and aptitude in the program are used as the basis for the discussion about his future.

The San Diego Zoo program was begun during the spring semester, 1958. It is part of a cooperative program with the San Diego City Schools, Division of Junior Employment, to provide opportunities for especially qualified and interested students to observe the professions of veterinary medicine, medicine, medical technology, and zoology. Students selected to participate in these programs must meet scholastic, aptitude, and interest qualifications.

The initial idea for programs of work exploratory experience for high school students was conceived several years ago by a group of consultants working with the National Defense Education Act Administration in Washington, D.C.

Equine Practitioners to Meet

A three-day professional program for equine practitioners will be held December 12-14 at the Westward Ho Hotel, Phoenix, Ariz.

Special presentations scheduled for the meeting are on fluid therapy, Quarter Horse practice, new diagnostic tests, diseases of the horse in Central America, subcutaneously induced counterirritants, fertility examinations of the mare, equine practice in the Hollywood film industry, and special surgery.

Four panel discussions are also scheduled. One will cover the currently serious problem of epizootic diarrheas at race tracks and breeding farms; another, the respiratory disease complex; the third, orthopedic surgery, and the fourth, radiology and radiotherapy.

New Veterinary Products Firm Established

The formation of Bi Vet Laboratories, Inc., has been announced by Dr. Earl L. Mundell (KSU '41), president.

Dr. Mundell, who has been director of biological production with another veterinary biological and pharmaceutical firm since 1946, says that BiVL will produce biological products for the veterinary profession only.

Dr. Mundell is a past chairman of the AVMA Committee on Biological and Therapeutic Agents, a past secretary of the Kansas City V.M.A., and a member of the U.S. Livestock Sanitary Association. He served on a special mission to India in 1955 as veterinary biological production specialist for the Technical Cooperation Administration, USDA, and the State Department.

Dr. Earl L. Mundell

Examinations Announced for U.S. Public Health Service Veterinary Officers

Competitive examinations for appointment of veterinary officers to the regular corps of the United States Public Health Service will be held on Jan. 31 and Feb. 1 and 2, 1961, for senior assistant applicants, and January 31 through February 3 for assistant applicants. Examining centers will be set up throughout the United States, and candidates will be tested at centers nearest their homes. Applications must be received by the Public Health Service no later than Dec. 2, 1960.

Appointments are available in field investigations, research, and public health in the United States and overseas.

Field investigations are conducted of animal diseases transmissible to man. In areas where these diseases are enzootic, Public Health Service field stations offer varied opportunities for training and experience in ecology, epidemiology, and control.

Public Health Service veterinarians act either as consultants or active participants in local health programs to improve public health, control disease, and fight epidemics.

Research opportunities in many aspects of medicine and science are available at the National Institutes of Health, the Communicable Disease Center, the Arctic Health Research Center, and the Division of Occupational Health. Research is also carried on in Public Health Service field stations throughout the United States.

The entrance examinations for these positions will include an interview, physical examination, and comprehensive objective examinations.

Dr. Dalys L. Berry to Head Nebraska Station

Dr. Dalys L. Berry (KSU '32) has been appointed inspector in charge of the Veterinary Biological Products Inspection Station of the Agricultural Research Service, USDA, at Omaha, Neb.

Dr. Dalys L. Berry

Dr. Berry will be in charge of the licensing and production inspection of veterinary biological products at the Omaha station.

Dr. Berry entered federal service with the virus-serum branch of USDA at Fort Worth, Texas, and in 1956 he transferred to Indianapolis, Ind., where he served as inspector-in-charge.

Dr. R. K. Somers Named Associate Director of Federal Meat Inspection

Dr. Robert K. Somers (MSU '36) has been named associate director of the Meat Inspection Division of the USDA effective Sept. 1, 1960. He succeeds Dr. Clarence H. Pals who became director of the Division in August.

Dr. Robert K. Somers

Dr. Somers joined USDA in 1936 and worked in the brucellosis eradication campaign in Michigan. Subsequent field assignments took him to South St. Paul, Minn. (1937-46), as veterinarian and supervisor of meat inspection, and to Dubuque, Iowa (1946-47), as acting inspector-in-charge. Dr. Somers was transferred to Washington, D.C., in 1947 as assistant to the chief of the Meat Inspection Service and area director for several midwestern and northeastern states. He became director of training for the Division in 1950. Since that time, he has also directed and supervised the Radiological Defense Training Team that received one of the USDA's unit awards for superior service in May, 1960, for its work in providing effective radiologic defense monitoring training to USDA personnel throughout the United States.

Dr. Somers also planned and supervised the new Meat Hygiene Training center that opened in Chicago, April 4, 1960.

Among the States and Provinces

Alabama

AUBURN UNIVERSITY TO SPONSOR THREE POST-GRADUATE SHORT COURSES FOR VETERINARIANS.—Auburn University's College of Veterinary Medicine will offer three short courses for veterinarians March 15-17, 1961. They are:

Clinical laboratory methods—will include basic diagnostic procedures in hematology, urology, bacteriology, and parasitology.

Clinical cardiology in the dog—will cover theory and practice of electrocardiography, auscultation roentgenography, and other diagnostic procedures. Medical and surgical means of management of cardiac diseases will be included.

Neurosurgery (canine)—will cover anatomy, physiology, physical and radiographic diagnosis, and treatment of various non-

infectious brain and spinal conditions in the dog. Surgical treatment of spinal conditions will be emphasized.

The registration fee for the courses in clinical laboratory methods and clinical cardiology in the dog will be $50. The fee for the neurosurgery short course will be $75.

Delaware

NEW CASTLE COUNTY V.M.A. ELECTS OFFICERS.—Officers elected at the September meeting of the New Castle County V.M.A. are Drs. William Schwartz (KSU '47), Wilmington, president, and Arthur P. Mayer (UP '57), Newark, secretary-treasurer.

Florida

HOG CHOLERA ERADICATION PROGRESSES.—A state Hog Cholera Eradication Advisory Committee was selected at a meeting of representatives of the Florida swine industry in Gainesville, September 15. A practicing veterinarian is a member of the committee.

Selection of the Florida Hog Cholera Eradication Advisory Committee ended four months of intensive work and meetings by members of the swine industry, the state veterinarian's office, and the research and extension staffs of the University of Florida.

The Florida eradication program planned at these meetings calls for increasing the number of pigs vaccinated until a high proportion of all pigs in Florida are vaccinated. The program pays for vaccine and also administration of it. Under the program, nonvaccinated pigs cannot be moved from the premises except for immediate slaughter at state or federally inspected slaughterhouses. Pigs vaccinated under the program can move on proof of vaccination by an official ear tag. All public stockyards and livestock markets must be thoroughly cleaned and disinfected, and this will be done under supervision. Part of the cost of disinfection will be borne by the program. Any pigs found to have hog cholera will be quarantined. Indemnity will be paid only for pigs that were vaccinated under the program.

One to two years from now, when the incidence of cholera becomes low, the state will destroy all known sources of hog cholera infection. After hog cholera has been eradicated, vaccination will be discontinued. It is expected that the program will be put into operation within a year.

If hog cholera can be eradicated, Florida will be in an excellent position to supply pork to the large Caribbean and Pan American markets. Countries in these areas now prohibit the importation of pork from areas in which hog cholera is present.

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PALM BEACH VETERINARY SOCIETY ELECTS OFFICERS.—Officers elected at the September meeting of the Palm Beach Veterinary Society are Drs. B. W. Bigger (MSU '51), Fort Pierce, president, and J. L. Liggett (AUB '57), West Palm Beach, secretary-treasurer.

Illinois

NORTHERN ILLINOIS V.M.A. CONTRIBUTES TO AVMA RESEARCH FUND.—The Northern Illinois V.M.A. voted to contribute $500 to the AVMA Research Fund at its meeting in Rockton, September 28.

New Association officers elected at the meeting are: Drs. C. H. Larson (MSU '50), Shabbona, president; M. W. Moore (ISU '43) Belvidere, president-elect; and H. S. Fike (MSU '40), McHenry, secretary-treasurer.

On the program were discussions on practical procedures in pony practice, problems encountered in the laboratory production of S.P.F. pigs, practical pointers on small animal practice, recent advances in bovine tuberculosis control, and the veterinarians role in swine repopulation.

Indiana

In an effort to tell the public about the public health contributions of veterinarians, the Calumet Area V.M.A. showed this exhibit at the Tri-State and Lake County Fair at Crown Point, Ind., Sept. 15, 1960.

Kentucky

DR. R. W. HAMMERMEISTER NEW STATE VETERINARIAN.—Dr. Russell W. Hammermeister (OSU '38) has been appointed state

Dr. R. W. Hammermeister

Dr. R. H. Singer

veterinarian for Kentucky. His appointment became effective July 17, 1960.

Dr. Hammermeister entered federal service for three years and worked in brucellosis control in North Carolina immediately following his graduation from veterinary college. He served in the Army from 1941 to 1946 and was discharged with the rank of major. Since that time he has maintained a general practice in Worthington, Pa., and then in Flemingsburg, Ken.

He succeeds Dr. Robert H. Singer (COL '54) in the post of state veterinarian.

Dr. Singer resigned because he was seriously considering accepting one of several offers he had to do laboratory or regulatory work in the animal disease control field.

He had formerly been associated with the University of Kentucky as a member of the Animal Pathology Department doing research in toxicology and nutritional diseases. He had also been employed for two years by the Veterinary Division of Winthrop Chemical Company in New York City.

Massachusetts

MASSACHUSETTS V.A. PRESENTS SCHOLARSHIP LOANS.—The first Massachusetts Veterinary Association Scholarship Fund loans of $500 each were granted to four Massachusetts students, presently at veterinary medical colleges, at the association's fall meeting in Worcester.

Loan recipients were Carl Knight, Stoneham, Michigan State University; Joseph F. Chabor, Whitinsville, University of Oklahoma, Richard J. Sheehan, Milton, Cornell University; and Andrew Cullen, Everett, University of Pennsylvania.

The Scholarship Loan Fund, designed to help eliminate the financial strain of pursuing a veterinary medical education and to inerease the availability of high caliber professional veterinary medical service to the animal population of our country, was set up last year. An initial gift of $10,000 was presented by Dr. Cornelius J. Thibeault (OSU '29), chairman of the Scholarship Loan Fund committee. Through contributions of other association members, the fund reached $25,000 in just one year.

The student loans will carry no interest until one year after graduation. The fund's trustees, Drs. Thibeault, G. B. Schnelle (UP '26), and K. L. Bullis (ISU '28), hope the fund will become large enough so that loans can be also be presented to students from other New England states.

Veterinary scholarship recipient Carl Knight, Stoneham, Mass., of Michigan State University School of Veterinary Medicine (right), is presented Massachusetts V.A. Scholarship Fund check by Dr. Cornelius J. Thibeault, Wakefield (left), chairman of the Scholarship Loan Fund committee, and Dr. Edgar W. Tucker, Concord, Massachusetts V.A. president.

New Jersey

NORTHERN NEW JERSEY V.M.A. PROVIDES EMERGENCY SERVICE.—The Northern New Jersey V.M.A. approved the establishment of an Emergency Veterinary Service program for Bergen County last June.

The association is underwriting the expense of maintaining a telephone exchange for emergency calls.

The program was set up to assure that veterinary services would be available to the public at all times. House calls and large animal veterinary services are not included in the plan.

All emergency calls go to a central exchange listed in Bergen County telephone directories. The veterinarian on duty is notified of the emergencies and provides the veterinary services necessary.

Each practice was assigned a one-week duty on emergency service. The association estimates that each practice will have about two weeks of emergency duty each year.

New Mexico

NEW OFFICERS ELECTED BY NEW MEXICO V.M.A.—New officers elected at the New Mexico Veterinary Medical Association's meeting September 12-13, in Ruidoso, are: Drs. Earl Leslie (KSU '55), Alamagordo, president; Ed Kraus (COL '32), Clovis, vice-president; and Leonard Payne (COL '51), Albuquerque, secretary-treasurer.

New York

NEW YORK V.M.A. MEETING CALLED BEST IN ASSOCIATION'S HISTORY.—The 69th annual meeting of the New York State V.M.A. in Syracuse, N.Y., September 14-16, was acclaimed the best in the society's history by the 260 veterinarians attending the sessions. Veterinarians' wives agreed that the meeting must have been good because, they said, they didn't see much of their husbands who were busy attending the scientific sessions.

General practice presentations were made on staphylococcic mastitis, anaphalaxis with Leptospira vaccine, new aspects in leptospirosis control, the incorrect use of drugs, clinical cardiology, uses and abuses of laboratory work in general, and practical suggestions for the horse practitioner.

A panel discussion was held on "General Surgery in Veterinary Medicine" and clinical briefs were presented by New York State V.M.A. members.

Veterinarians specializing in small animal practices attended clinical workshops on laboratory procedures, neurologic diagnostic procedures, radiologic procedures, and clinical procedures.

Some of the speakers making these scientific presentations were: Drs. David K. Detweiler (UP '42), University of Pennsylvania; Delano L. Proctor (COR '42), equine specialist from Lexington, Ky.; and Laurence Slanetz, University of New Hampshire.

Bettering veterinary relations was a topic that also had a large sized spot on the program. Dr. Norman S. Moore, M.D., president of the Medical Society of the State of New York, spoke at the banquet session urging closer relationships between the veterinary and medical professions; Mr. Austin W. Carpenter, executive director of the Eastern Federation of Feed Merchants, discussed the relationship between veterinarians and feed men; and Mr. Harry H. Costello, publisher of *Modern Veterinary Practice*, spoke about the ways public interest may bring changes in veterinary practice.

New York State V.M.A. members tried to see themselves as others might see them through staging a debate to focus attention on the many avenues of professional improvement open to veterinarians.

Actions taken by the society at its business session were resolves to extend an invitation to the American Veterinary Radiology Association to hold a joint regional meeting with the New York State V.M.A. in June, 1961; publish a brochure on a dairy herd health program under the supervision of the Committee on Dairy Herd Disease Control; approve a new membership classification of "associate membership"; and approve major recommendations of committees dealing with ethics, universal meat inspection, public health, and professional relationships.

Officers elected at the meeting are: Drs. Charles E. Fletcher (COR '31), president; Howard K. Fuller (NYS '32), president-elect; and William C. Hirschey (MSU '38), treasurer.

North Dakota

DR. D. F. EVELETH TO BE A FULBRIGHT LECTURER.—Dr. Donald E. Eveleth (ISU '34) has been selected by the United States De-

partment of State to be a Fulbright lecturer at Cairo, Egypt, from Jan. 1, 1961, to June 1, 1961. He will lecture on infectious diseases of domestic animals and parasitology.

Dr. Eveleth will take a sabbatical leave from his duties as head of the North Dakota State Veterinary Science Department.

Oregon

OREGON V.M.A. URGES MORE VETERINARY PARTICIPATION IN PUBLIC HEALTH.—Concern for improved procedures in the public health field was expressed by the Oregon V.M.A. at its meeting September 26.

The O.V.M.A., noting an increase in zoonoses, urged that a doctor of veterinary medicine be appointed to all city, county and other local agencies or boards charged with the responsibility for protecting public health.

Also in the field of zoonoses Oregon delegates passed a resolution favoring more coordinated action between practitioners in human and animal medicine.

Other resolutions passed at the meeting urged provision of diagnostic laboratory facilities for virus diseases at Oregon State College, and asked for the designation of an extension veterinarian in the state extension system.

Following the meeting, James F. Short, Oregon director of agriculture, called a meeting of Oregon V.M.A. representatives to discuss reorganization plans for the state Agriculture Department.

Mr. Short announced that he hopes to give veterinary service a full division status in the department. It was formerly under supervision of the Animal Industry Division. He said he also intends to set up the office of deputy director of agriculture, who would be in charge of veterinary functions as well as other responsibilities within the department.

Pennsylvania

BAN ON HOG IMPORTS FROM DELAWARE ENFORCED.—Pennsylvania's State Secretary of Agriculture William L. Henning banned movement of live swine into Pennsylvania from Delaware on September 19.

The emergency action was taken because hog cholera is approaching epizootic proportions in Delaware and fully virulent, live virus vaccine is being used to combat the disease. Use of the virus vaccine is prohibited in Pennsylvania.

The embargo on Delaware hogs will be in force until official notice is received from the chief livestock sanitary official of Delaware that the epizootic is under control.—*National Hog Farmer, Vol. 5, No. 10.*

South Dakota

SOUTH DAKOTA V.M.A. HEARS DR. LEASURE, ELECTS NEW OFFICERS.—Dr. E. E. Leasure, AVMA president, and Mrs. Leasure, president of the Women's Auxiliary to the AVMA, spoke before their respective organizations at the South Dakota V.M.A. annual meeting in Sioux Falls, September 17-19.

Officers elected at the meeting are: Drs. D. F. Rigo (COL '51), Menno, president; L. H. Valantine (OSU '52), Wakonda, vice-president; and H. K. Caley (KSU '52), Webster, secretary-treasurer.

The association's next annual meeting will be held in Huron, S. D., in September, 1961.

Texas

SPOT ANNOUNCEMENTS ON RABIES SUCCESSFUL.—Texas V.M.A. members have reported that radio stations throughout the state are using spot announcements on rabies issued by the association in August.

The announcements and a letter describing the need for disseminating information about rabies to the public were issued to the stations by Dr. Horace T. Barron (TEX '41), Texas V.M.A. president.

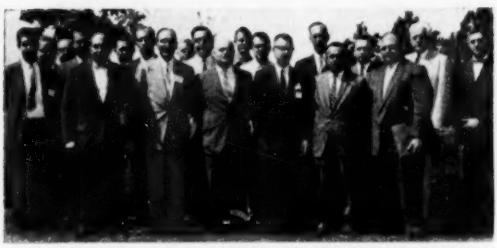
In his letter to broadcasters, Dr. Barron told them that over 26 per cent of the rabies cases in the United States were found in Texas. He also said that 227 cases of rabies were reported in Texas during the first three months of the year. He called the situation alarming and asked for cooperation in bringing the problem to the attention of radio listeners.

Virginia

SHORT COURSE PRESENTED AT POLYTECHNIC INSTITUTE.—"Dairy Herd Management and the Veterinarian" was the theme of a short course attended by 20 veterinarians in Blacksburg, Va., September 12-14. It was

sponsored by the Virginia Agriculture Extension Service in cooperation with the Virginia V.M.A. and the Veterinary Science Department of Virginia Polytechnic Institute.

The course was designed to familiarize the general practitioner with the economics of the dairy industry, contractual veterinary practice, and herd health management. It was also planned to reacquaint the practitioner with basic feeding and management practices.



The short course "Dairy Herd Management" students are shown after attending the three-day session at the Virginia Polytechnic Clinic.

Lectures were presented by Drs. O. A. Ranstead (OSU '53), Royal Center, Ind., who discussed "Herd Health Management"; W. A. Rader (MSU '41), Lakeview, Mich., "Veterinary Contracts" and "Veterinary Economics"; H. G. Hodges (COR '16), New York, N.Y., "Milking Procedures and Mastitis"; and W. O. Crutchfield (UP '42), Roanoke, Va., "A Herd Health Program and Contractual Practice."

Staff members of the Agricultural Economics Department, Dairy Department, and Agricultural Engineering and Entomology Departments of VPI also discussed dairy herd management.

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SOUTHWEST VIRGINIA V.M.A. MEETS.—The monthly meeting of the Southwest Virginia V.M.A. was held Sept. 1, 1960, at the Veterinary Science Laboratory, Blacksburg.

The guest speaker, C. L. Boatwright, M.D., discussed new aspects of cancer research.

s/D. F. WATSON, *Secretary*

West Virginia

WEST VIRGINIA V.M.A. ELECTS NEW OFFICERS.—New officers elected at the meeting of the West Virginia V.M.A., September 24 are: Drs. Leo J. Meyer (WSU '40), Martinsburg, president; R. J. Frilen (OSU '51), Beckley, president-elect; and Harry J. Fallon (COR '38), Huntington, secretary-treasurer.

Presentations made at the scientific sessions were on bovine surgery, new concepts of distemper, diagnosis and treatment of digestive ailments in dairy cattle, what veterinarians should know about milking ma-

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The Virginia Council on Health and Medical Care is currently showing this exhibit at fairs, career nights, and professional society conventions. The career of veterinary medicine has been given a prominent position on the exhibit which displays information on many health careers. Dr. Martin B. Marx, public relations chairman of the Virginia V.M.A., and Mrs. Cynthia N. Warren, R.N., director of the Health Personnel Program of the Virginia Council on Health and Medical Care, are scanning some of the career materials.

chines, and respiratory problems in brachycephalic dogs.

The Greenbrier Hotel in White Sulphur Springs, W.Va., will be the site of the association's next meeting.

Wisconsin

FORTY-FIVE NORTHEASTERN WISCONSIN VETERINARIANS MEET.—The 23rd annual meeting of the Northeastern Wisconsin V.M.A. was held September 21 in Oshkosh, and was attended by 45 veterinarians.

New officers elected by the group are: Drs. K. B. Hammerberg (ONT '10), New London, president; Alvin Prather (KSU '52), Manawa, vice-president; William Madson (CVC '11), Appleton, secretary; and H. R. Trombley, Appleton, treasurer.

Dr. Frank Gentile (ISU '42), Milwaukee, president of the Wisconsin V.M.A., spoke at the meeting.

Foreign News

Israel Veterinarian Dies

Professor A. Komarov, director of the Veterinary Institute and Services of Israel, died July 31, 1960.

Professor Komarov is credited with the establishment of the Veterinary Institute. For more than 30 years, he had devoted his work to the advancement of agricultural and veterinary sciences.

The *Journal of the Israel Veterinary Medical Association* said of him, "His sudden death has brought to a halt a career which held out still further promise. His demise has left a void which will not easily be filled."

State Board Examinations

ARIZONA—Jan. 18-19, 1961. University of Arizona, Tuscon, Ariz. Dr. William E. Snodgrass, Secretary, Route 2, Box 373, Glendale, Ariz.

NORTH CAROLINA—Jan. 26-27, 1961. Carolina Hotel, Raleigh, North Carolina. Dr. James I. Cornwell, secretary, P.O. Box 9038, Asheville, N.C.

TEXAS—Jan. 28-29, 1961, Rice Hotel, Houston, Texas. Applications must be received 30 days before examination. Dr. T. D. Weaver, Executive Secretary, 207 Capital National Bank Building, Austin 16, Texas.

Deaths

Star indicates member of AVMA

★Ora L. Campbell (KCV '14), 73, a general practitioner in Astoria, Ill., for 46 years died Sept. 10, 1960.

Dr. Campbell was employed by the Illinois Department of Agriculture at the time of his death. He was a member of the AVMA and of the Illinois State and Mississippi Valley V.M.A.'s.

One of his sons, Dr. Bernard Campbell (ILL '53), is also a veterinarian.

★Thomas Castor (UP '94), 87, Philadelphia, Pa., died Sept. 12, 1960. Dr. Castor was an honor roll member of the AVMA. After 29 years as head of the Philadelphia District, Bureau of Animal Industry, USDA, Dr. Castor retired in 1935. He was a former faculty member at the University of Pennsylvania School of Veterinary Medicine and a veteran of the Spanish-American War.

John W. Church (KSC '46), 41, state veterinarian for the Lockwood, Mo., area, died Sept. 7, 1960. He had just recently moved to Lockwood from Maryville, Mo.

★Major Donald F. Freshour (MSU '35), 49, Durand, Mich., died Sept. 13, 1960, in Berlin, Germany, of a heart ailment.

Major Freshour practiced in Brighton, Mich., and worked for the USDA in Charleston, W. Va., before entering the Army Veterinary Corps in August, 1945. He had been on duty in Berlin since November, 1958.

Leslie J. Heiden (MSC '23), 63, Escanaba, Mich., died Aug. 30, 1960.

Dr. Heiden had practiced in Escanaba since 1927 and was the Delta (Mich.) County veterinarian for the past 25 years.

Emil H. Ingold (CVC '18), 70, died in San Jose, Calif., Sept. 2, 1960.

Dr. Ingold was an inspector for the USDA before moving to San Jose 15 years ago.

★**Earl R. Kennedy** (TH '15), 65, veterinarian in Moline, Illinois, for 45 years, died Sept. 14, 1960.

Dr. Kennedy joined his father in a veterinary practice immediately after graduation from veterinary college. He was also an assistant veterinarian for the USDA in the Department of Livestock and Industry.

Besides being an AVMA member, Dr. Kennedy was a member of the Quad-City, Mississippi Valley, Illinois State and Eastern Iowa V.M.A.'s and of the Midwest Animal Association and the A.A.H.A.

Louis Leonpacher (MUN '13), 70, a Lafayette, La., general practitioner died Sept. 5, 1960, of a heart ailment.

Dr. Leonpacher, was born in Germany. He had practiced for 34 years in Lafayette and received national fame as the first veterinarian in the area to make calls by airplane. He was also considered an authority on anthrax.

One son, Walter E. Leonpacher (GA '52) maintains a practice in Lafayette. Another son, Robert, is a veterinary medical student at Texas A. & M.

★**C. Thomas Litton** (SF '15), 73, San Francisco, Calif., died Sept. 9, 1960.

Besides maintaining the Inglewood Small Animal Hospital, Dr. Litton was consulting veterinarian for the Thousand Oaks Animal Farm and several motion picture studios.

★**Julian J. Parker** (KCV '06), 79, Fort Worth, Texas died in November, 1958.

Dr. Parker was named a life member of the AVMA in 1955.

Harry P. Reed (ONT '98), 85, died May 7, 1960, in St. Petersburg, Fla.

Dr. Reed had maintained a practice in Livonia, N.Y., for 51 years. During this time, he had also served a term as the town's mayor. He retired and moved to St. Petersburg two and one half years ago.

Jesse E. Spore (IND '21), 75, Princeton, Ind., died Sept. 11, 1960.

Dr. Spore had practiced in Princeton since 1921. He remained active until several days before his death.

★**Alex C. Topmiller** (MCK '07), 75, Nashville, Tenn., died of a heart ailment Aug. 28, 1960.

Dr. Topmiller had been hospitalized since suffering a heart attack in his office five weeks before his death. The heart attack occurred a day after he had vaccinated 47 head of cattle—supporting himself on crutches because of arthritis. About five years ago he switched his predominantly large animal practice to small animal because of the arthritis condition. He served as state veterinarian from 1931 to 1941.

He was a past-president and a past secretary-treasurer of the Tennessee Veterinary Medical Association and an honor roll member of the AVMA.

W. A. Weldon (CVC '08), 78, Dwight, Ill., a general practitioner for 50 years, died Aug. 30, 1960.

★**J. D. Winn** (ONT '36), 50, a professor of animal diseases and a poultry pathologist at the University of Connecticut since 1946, died Sept. 16, 1960.

Dr. Winn maintained a private practice in 1936 and 1937. He was appointed state disease control veterinarian in 1937, a position he held until 1942, when he entered the Army Veterinary Corps. He was discharged from the Army as a captain in 1946.

Fred A. Wolfe, (KCV '10) died Feb. 8, 1960, in Brookfield, Mo.

Dr. Wolfe maintained a general practice at Linneus, Mo., until 1951 when he was forced to retire due to ill health.

Joseph R. Zecha (TH '13), 79, Ellenwood, Kan., died April 10, 1960.

Women's Auxiliary

Projects and Personalities

Would you enter an injured puma's cage the day before you were expecting a baby? Most women wouldn't, but Dr. Patricia O'Connor, Staten Island Zoo veterinarian, did and said that it's "all in a day's work."

And a day of Dr. O'Connor's work may include some mighty unusual activities—such as giving polio shots to chimpanzees, amputating the tail of a 15-year-old East African leopard, or removing a tumor from the flank of a jaguar.

Dr. O'Connor, a 1939 graduate of New York State Veterinary College, Cornell University, serves as curator of birds and mammals at the zoo, lectures and teaches zoo attendants, and participates in professional organizations. In 1951 she served as vice-president of the Women's Veterinary Medical Association.

In 1955, a bibliography, prepared by Dr. O'Connor, of the pathology of wild birds and mammals was published in the *American Journal of Veterinary Research.*

Dr. O'Connor gives Patsy her first polio shot.

Dr. O'Connor Visits "Colo" a baby gorilla born in the Columbus, Ohio, Zoo.

According to Dr. O'Connor, the incidence of illness among the zoo animals is low because of the strict quarantine of newly acquired animals and vigorous sanitation methods.

Quarantines are necessary because "Contrary to popular opinion, all wild animals in the natural state are not necessarily healthy," Dr. O'Connor says. "They suffer bone fractures, malnutrition, starvation, exhaustion, and severe parasitism."

Treatment of wild animals is simplified through the use of a squeeze cage that holds the animal still so that injections may be given.

"Wild animals in captivity have access to modern drugs and medical care and have a far greater chance of attaining their maximum life expectancy," Dr. O'Connor says.

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FURAMAZONE, brand of nifuraldezone, (5-nitro-2-furaldehyde semioxamazone), another outstanding therapeutic agent of the nitrofuran group, is one of the active ingredients of ENTEFUR Boluses Veterinary, Small.

FURAMAZONE is bactericidal to gram-positive and gram-negative organisms, and is particularly effective against bacteria associated with calf scours, including virulent E. coli.

Osborne[1] found that in ". . . a sizable number of cases of naturally occurring white scours [calves] the in vitro efficacy of FURAMAZONE has been confirmed in vivo."

Henry and Blackburn[2] report that in a controlled clinical study of calf scours treated with FURAMAZONE, "of the 63 treated calves only three died, while 21 of the 24 untreated controls succumbed."

The safety of FURAMAZONE has been well established in extensive toxicological studies. It is nontoxic even when given for prolonged periods of time in doses well above therapeutic levels.

References: 1. Osborne, J. C.: New Horizons in Chemotherapy: Proceedings of The First Regional Conference on the Nitrofurans in Veterinary Medicine, June 5, 1958. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med. 52:122 (Mar.) 1957.

WHAT IS YOUR *Diagnosis?*

Make your diagnosis from the pictures below — then turn the page

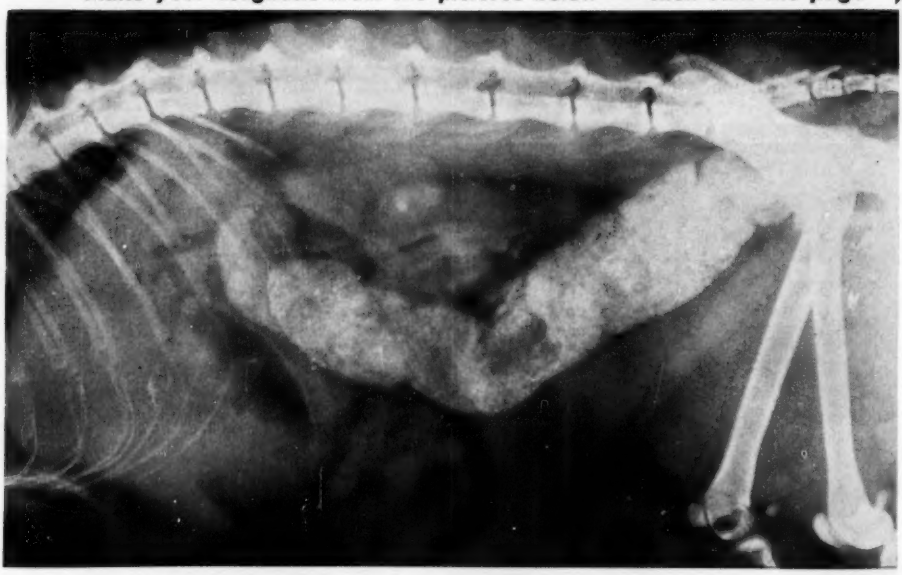
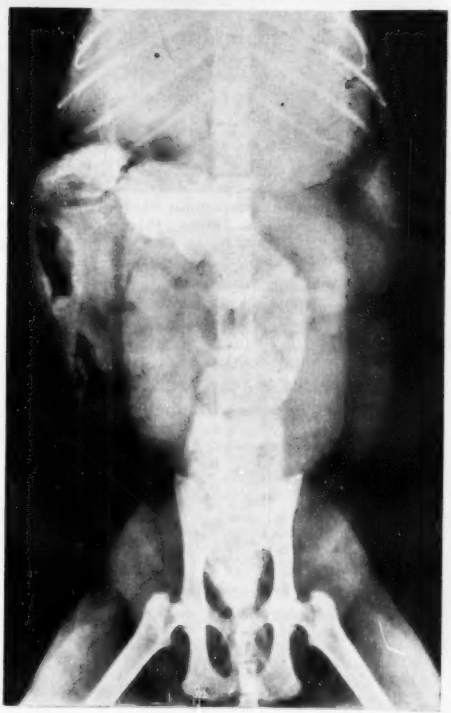


Fig. 1 (above)—Lateral recumbent radiograph of the abdomen of a cat.

Fig. 2 (right)—Ventrodorsal radiograph of the abdomen of a cat.



History.—A stray male cat, approximately 1½ years old, became friendly with a family who fed it. It was noticed that the cat often had an enlarged abdomen, strained as if to defecate, and passed a watery stool. When palpated, the colon was found to be enlarged throughout its length and impacted with a large quantity of hard feces. Lateral and ventrodorsal radiographs were taken of the abdomen (fig. 1 and 2).

Here Is the Diagnosis

Diagnosis.—Megacolon.

Comment.—Megacolon is relatively rare and is thought to be the result of peristaltic deficiency or failure resulting in fecal accumulations and impactions.

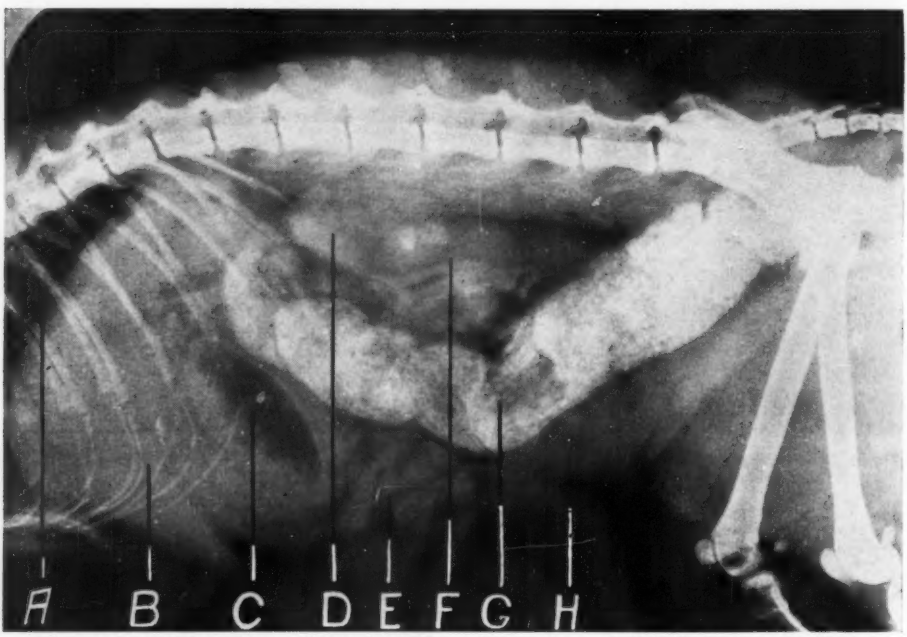


Fig. 3—Lateral recumbent radiograph of the abdomen of a cat; (A) diaphragm, (B) liver, (C) stomach, (D) cecum, (E) small intestines, (F) kidney, (G) megacolon, and (H) urinary bladder.

The hypoperistaltic activity is thought to be the result of maldevelopment or malfunction of the caudal mesenteric ganglion. In man, satisfactory bowel function has been established following the removal of the nonfunctioning section of the bowel.

This case was presented by J. Raymond Currey, D.V.M., Washington, D. C., and was prepared with the assistance of Wayne H. Riser, D.V.M., M.S., Kensington, Md.

FOR CALF SCOURS

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BOLUS VETERINARY, SMALL

COMBINES

FURAMAZONE (1 Gm.)—for specific antibacterial activity against gram-negative and gram-positive enteric bacteria

BISMUTH SUBSALICYLATE (0.26 Gm.)—for astringent, antidiarrheal activity, and as a protective to the lining of the gastrointestinal tract

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"UNIFORMLY EXCELLENT RESULTS . . ."

Bull, W. S.: N. Am. Vet. 38:3 (Jan.) 1957.

Dosage: 1 bolus perorally, twice daily, for 2 or 3 days.
Supplied: Boluses of 3.3 Gm. each, in boxes of 24 and 500.

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NEW

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INJECTABLE VETERINARY

for large animals...for small animals...for poultry

Erythrocin Injectable Veterinary is a safe, fast-acting antibiotic with a wide range of indications in both large and small animals.

Fast Blood Levels

Erythrocin Injectable administered at therapeutic dosage will provide peak blood levels in one to two hours, with effective concentration remaining in the system for several hours.

Effective against "Resistant" Strains

Studies have shown Erythrocin Injectable effective against staph, strep, and pneumococci—*including some strains which have become resistant to the action of other antibiotics.*

Safe

Erythrocin has an unparalleled record of safety in use in human medicine. Clinical trials on over 1900 large and small animals indicate that Erythrocin Injectable Veterinary also has a high order of safety. In addition, there are seldom complications with Erythrocin therapy and little likelihood of resistance developing during, or as a result of, treatment.

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Bactericidal against some Common Invaders

Erythrocin is classified as bactericidal, against certain coccal organisms. This means prompt clinical results for your patients.

Many indications in Veterinary Practice

Some typical large and small animal conditions for which Erythrocin may be successfully used, include: pneumonia, upper respiratory infections, "shipping fever", mastitis, metritis, "foot rot", wound infections, pleurisy, "lamb dysentery", secondary infections (as in canine distemper), and as an aid in the management of leptospirosis in sows at farrowing and of some "scours" in young pigs.

Available in two Sizes

Erythrocin Injectable Veterinary (List No. 8589) comes in 250 and 100 ml. bottles. It is stable at normal room temperature and retains its potency indefinitely.

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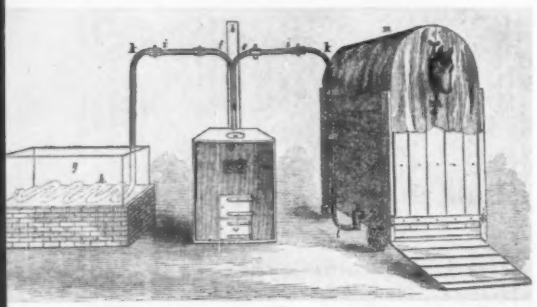
History of the AVMA

1898

The 35th annual meeting of the Association at Omaha in 1898 was to be the last held as the United States Veterinary Medical Association. Acting upon the recommendation of the Executive Committee, it was unanimously voted to change the name to the American Veterinary Medical Association. President Salmon had urged: "This proposition is in line with the growth and development of this body . . . some disadvantages . . . will probably be more than counterbalanced by the wider range of our vision and the nearer approach to a cosmopolitan character."



"An ingenious portable . . . vapor and medicated bath" for horses, displayed at the first AVMA clinic.

Dr. Salmon reviewed the recent progress in animal disease research, noting: ". . . . there is nothing more remarkable than the influence which the study of animal diseases has had upon the advancement of human medicine, and the resources which the investigators of this subject have laid at the feet of suffering humanity. The elucidation of the nature of contagion; the establishment of scientific disinfection; the development of aseptic surgery; the introduction of bacterial products, vaccines, animal extracts and antitoxins for the treatment of various diseases are well-known examples."

A proposition to increase the presidential term from one to two years, Dr. Salmon deemed ". . . ill-advised and undesirable. We have had numerous members of this Association who should have been honored with the presidency but for whom the opportunity has never come. If we double the length of the term, we lessen by 50 per cent the chances of every member to gain this distinction, which should be coveted by all." In the 34 years preceding Salmon's election, there had been 18 presidents, only seven of whom had served a single term. Since then, only two presidents have served a two-year term: C. J. Marshall, because no meeting was held in 1914, and James Farquharson, during World War II.

At the first AVMA clinic, held in a barn on Capital Avenue, "The first operation was upon a ridgling by Dr. George A. Scott, of Independence, Iowa . . . Dr. L. A. Merillat, of the McKillip College, Chicago, now stepped forward and announced that he would perform on . . . an extremely bad roarer . . . his new operation of 'arytenoideraphy,' and did so to the delight of all. He is a cool surgeon, and . . . his method was very favorably commented upon. At the conclusion of the operation, and while the patient was still under chloroform narcosis, Dr. W. L. Williams, of New York, began the removal of the ovaries from a vicious little old mare."

An exhibit of some interest was "an ingenious portable . . . vapor and medicated bath" for horses. "An alcohol stove within this tightly closed room quickly raises the temperature to . . . about 180°F., when the animal will be thrown into a profuse perspiration." A similar device had been advocated by George Dadd in his *Modern Horse Doctor* (1854), and in 1818, James Carver of Philadelphia had advertised his "Patent Universal Veterinary Medical (vapor) Bath" in his ill-fated *Farrier's Magazine.*

Dr. A. W. Clement was elected president; Sesco Stewart and W. H. Lowe were re-elected secretary and treasurer, respectively.

✦ ✦ ✦

ALBERT W. CLEMENT, first president of the newly-renamed AVMA, was born in Lawrence, Mass., in 1857. He spent two years at Harvard University and in 1879 went to McGill University where he was graduated from the veterinary school in 1882. Following graduation he taught at McGill and investigated cattle diseases for the Canadian government. After two years' study in Europe, he pursued animal disease investigations at the Johns Hopkins University for six years. He was also connected with the BAI and was active in promoting the veterinary aspects of public health in Baltimore. In 1896, he was appointed state veterinarian of Maryland, and in 1898 elected president of the AVMA. His death in Baltimore on March 3, 1901, at 44 years of age, was a great loss to the veterinary profession.

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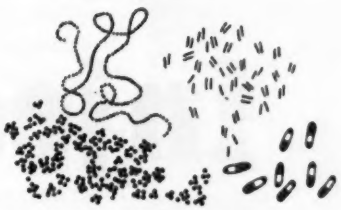

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Highly effective against a wide range of pathogenic bacteria . . . *even problem pathogens* like Pseudomonas and Staphylococcus.

PROLONGED TOPICAL ANESTHESIA

Relief from pain is *quick, profound, prolonged* . . . benzocaine stops scratching and thus reduces the spread of infection . . . hastens healing.

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Propylene glycol is eleven times more penetrating than glycerin . . . carries medication to *every tiny crevice*. Urea encourages debridement.

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Rapidly absorbed from injection site

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Liquamycin Injectable is a recommended addition to your drug inventory during the fall and winter months when the greatest incidence of respiratory diseases occur.

Wide range of antimicrobial activity is an advantage when treating the mixed bacterial infections* commonly encountered in respiratory cases under field conditions.

This preconstituted, ready-to-use solution form is rapidly absorbed from the injection site. Following the administration of 2 mg. per pound of body weight in cattle, the antibiotic blood serum level can be detected for at least 36 hours.

Economical. Costs no more to use than many products that are not as effective or convenient to use.

And this new, all-liquid form offers many conveniences of use.

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• no special handling problems—Liquamycin Injectable needs no refrigeration . . . no protection from freezing even at extremely low temperatures. And its highly stable form assures a long storage life.

• ready to use—no mixing needed.

Liquamycin Injectable is available in 500-cc. bottles containing 25 grams of oxytetracycline activity and in 50-cc. dispensing vials containing 2.5 grams oxytetracycline activity.

*due to oxytetracycline-susceptible organisms

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Chutes are made for either right or left side operation. Only one man is necessary to handle the complete operation. Adjustable squeeze gate sets the chute right for any size animal.

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Facts and Figures About Dogs

The canine population, now estimated to be about 26,000,000, is growing twice as fast as the human population. Some 18,000,000 families own a dog or dogs (more than 3,000,000 homes have 2 or more). Between 3,500,000 and 4,000,000 pups are born annually, and the sales volume may be running as high as a million dogs a year. The estimated annual dollar volume of purebred dog sales is about $25,000,000.

The annual sales volume of the dog industry as a whole probably exceeds $500,000,000, including the $350,000,000 spent last year on prepared dog foods. No less than $25,000,000 a year goes for toys, shampoos, brushes, leashes, collars, and other accessories. Dog license fees total about $35,000,000 a year, and costs of medical care, including both veterinarians' fees and medications, come to about $120,000,000.—*Consumer Rep., 25, (July, 1960): 340.*

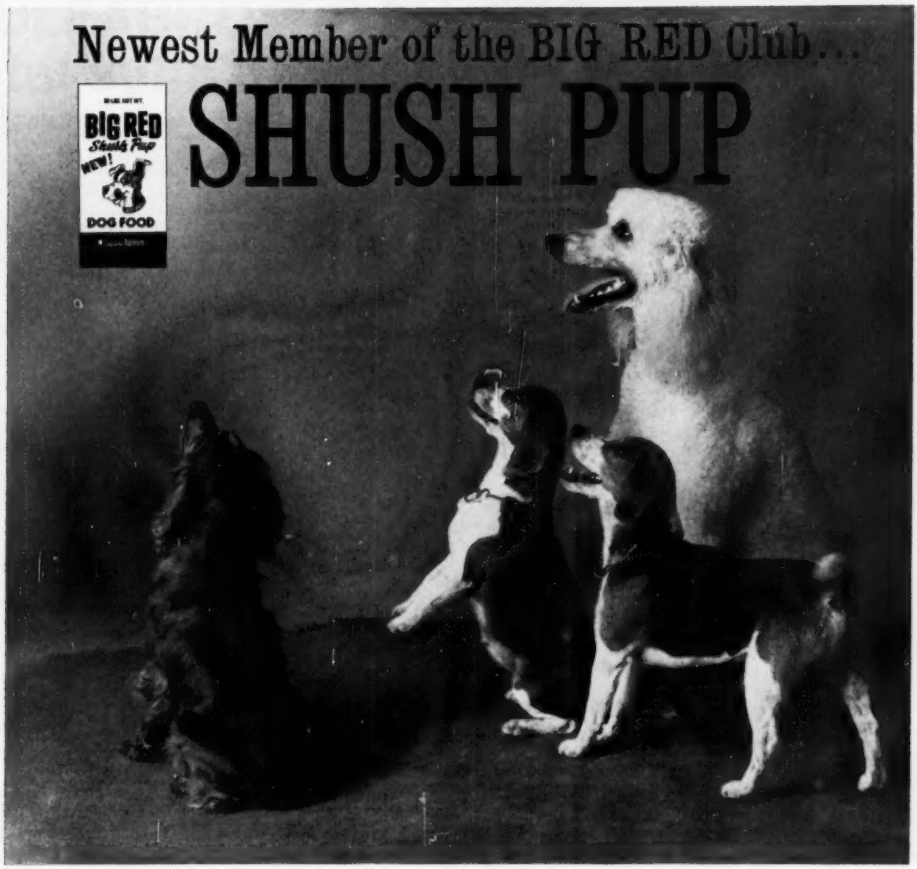
New Research Planned on Screwworm

New research on the screwworm will begin at Kerrville, Texas, and will be financed by a $200,000 supplemental appropriation recently approved by Congress. The new research will be conducted by entomologists of the ARS under the direction of Dr. Raymond C. Bushland.

One important aim of the Kerrville research is to learn more about the nutritional requirements of the screwworm larvae so an improved, inexpensive rearing medium may be developed. Project scientists will also seek new methods by which these insects can be irradiated with minimum effect on their life processes.

Efforts will be made to develop suitable attractants for screwworms. Such attractants are needed in fly-trapping operations to determine the extent and density of natural screwworm populations.

The research will also explore the possibility of producing special genetic strains of screwworms through irradiation. There is a need, for example, to develop laboratory-reared flies with markings that easily distinguish them from normal flies, facilitating field experiments with sterilized flies.—*USDA Release, July 25, 1960.*



When clients leave their pets with you they do it with confidence...confidence in your skill as a doctor...confidence in your kindness and understanding...confidence that their pets will be returned in better health.

You know how hard it is to get some pets to eat in the relatively short time they're in your care. Pets that get special foods... pets that are pampered at home.

Now—with Shush Pup as a member of the Big Red club—you can choose from 8 Big Red foods...one that's sure to please even the fussiest eater.

Shush Pup is a complete formula...can be fed wet or dry...designed for hard-to-please canines. All ages, all breeds go for these crunchy, tasty puffs in a big way. This makes your feeding job easier, lets you concentrate more on medical and surgical practice.

Shush Pup is economical, too. See your local G.L.F. man or write Big Red, Box 343, Canandaigua, N. Y.

BIG RED DOG FOODS *at your local G.L.F.*

Sgt. Applegate

Also—
Meal, Pellets, Kibble, Beef, Horsemeat, Chicken, Ration

Quiz for Quidnuncs

1. How effective are modified live virus canine distemper vaccines? Page 580.

2. What drug has been shown to have practical benefit in controlling skeletal muscle spasms in dogs? Page 585.

3. How effective is Bayer 21/199 in controlling cattle grubs and lice? Page 594.

4. What disease in calves has been confused with tuberculosis on the basis of lung lesions observed at necropsy? Page 596.

5. How useful are expansion-type intramedullary pins for immobilizing equine metacarpal fractures? Page 599.

Above is Schering Corporation's new administration building in Union, N. J., which now houses the veterinary medical and the marketing departments.

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Few Useful Pesticides Are Developed

Thirteen years of research by ARS entomologists and veterinarians at Kerrville, Texas, show that few of the new pesticides proved to be both effective and safe to animals and man. The USDA scientists have studied more than 17,000 new chemicals since 1947, and about 3,000 were tested at Kerrville for use against livestock parasites. For one reason or another, most of the 3,000 were eliminated, leaving only 10 recommended for use in 1959.—*USDA Press Release, April 28, 1960.*

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SULFABROM SOLUTION 6.25%... joins SULFABROM BOLUSES to supply your total sulfa needs on an exclusive basis

NEW SULFABROM SOLUTION 6.25% AND SULFABROM BOLUSES ARE THE ONLY SULFAS AVAILABLE EXCLUSIVELY TO VETERINARIANS

PROLONGED ACTION: Ordinary sulfonamides, including sulfathiazole and sulfamethazine, peak during the first 24 hours after treatment, but then soon fall below the necessary or effective 5 mg./100 cc. level. Not so with SULFABROM SOLUTION or SULFABROM BOLUSES. They can establish and maintain therapeutic blood and plasma levels *for as long as 48 hours* in cattle.

DOSAGE AND ECONOMY: Recommended treatment levels with new SULFABROM SOLUTION are 25-50 cc. per 100 lb. of body weight when injected intravenously and 50 cc. per 100 lb. of body weight when injected intraperitoneally. Cost of treatment per animal is remarkably low —only about 50¢ to $1.

RESULTS: The following remarks are abstracted from actual clinical investigation reports on the use of SULFABROM SOLUTION on file at the Merck Animal Science Research Department. (1) "*Symptoms:* Recently shipped-in cow. Temperature 106°. Labored breathing. Rales audible over chest area. *Diagnosis:* Pneumonia (shipping fever complex). *Treatment:* 700 cc. SULFABROM SOLUTION in one dose daily for two days. Sixty grams of SULFABROM BOLUSES given at time of I. V. injection. *Results:* Temperature returned to normal in 24 hours". (2) "*Symptoms:* Dystocia with removal by forced extraction of putrefied fetus. Temperature 104°. Rapid pulse and breathing. Anorexia. *Diagnosis:* Metritis. *Treatment:* Two doses SULFABROM SOLUTION 700 cc. each. *Results:* Temperature 101.6° in 24 hours. Appetite returning". (3) "*Symptoms:* Foul hoof—limited to 'between the toes' variety with swelling. *Diagnosis:* Foot rot. *Treatment:* 700 cc. SULFABROM SOLUTION. *Results:* Eight of 11 animals walked normally in 48 hours with swelling reduced to normal or near normal. Three animals required second treatment and returned to normal in 48 hours".

These quoted reports are typical of those being received from clinical investigators and veterinarians. We believe they demonstrate that *the only sulfas available to you exclusively*—new SULFABROM SOLUTION and SULFABROM BOLUSES—are also the most effective you can use.

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SOLUTION 6.25%

SULFABROM®

(Sodium Sulfabromomethazine) BOLUSES

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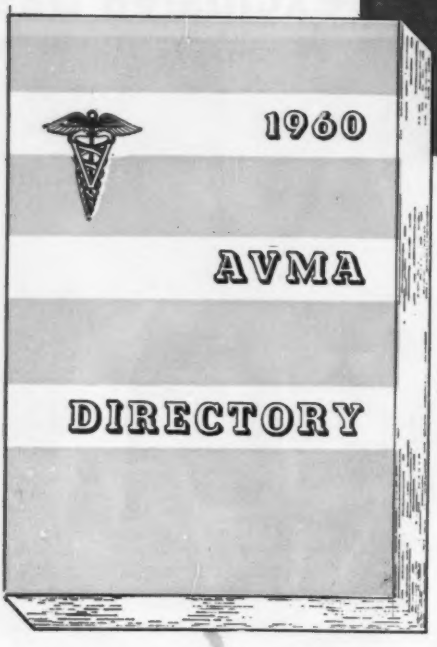

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For many years Friskies Meal has stood for the finest in a dry dog food. Now a great new Friskies Meal has been developed... finer even than the Friskies Meal you may already know!

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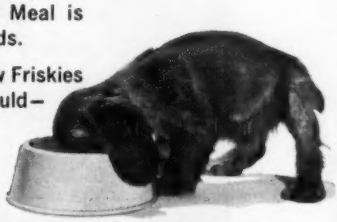
Great new convenience! New Friskies Meal mixes as a dry dog food should – instantly... completely – without caking or mushing – ever! There's no sticking to bowl – never a messy cleanup after feeding.

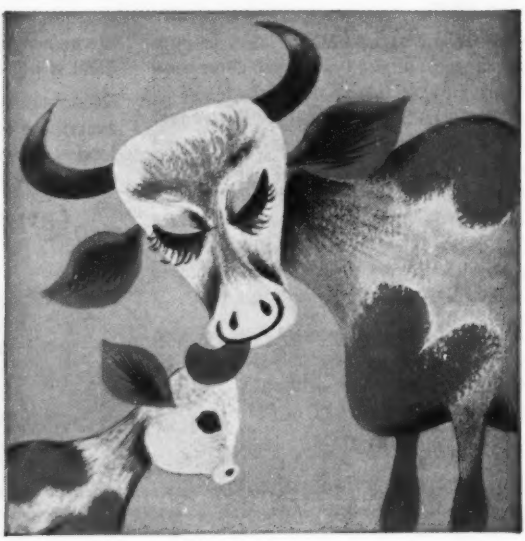
Complete, balanced formula! As always, Friskies Meal is complete with every vitamin, mineral and other nutrient dogs are known to need. In addition, new Friskies Meal is high in digestibility.

Recommend new Friskies Meal today. It's everything dog owners could want in a dog food – just what you'd expect from Carnation.



For variety... suggest Canned Friskies – hearty with meaty-rich flavor – and Friskies Cubes – entirely new kind of dog food so palatable it can be fed dry.

New, effective treatment for impaired fertility in cows



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BRAND OF NITROFURAZONE

Solution Veterinary SQUEEJET® and Suppositories Veterinary

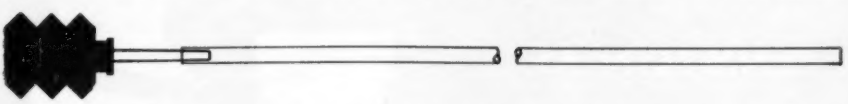
- **reduces services per conception**
- **shortens intervals between calvings**

Impaired fertility in cows, commonly accepted to result from non-specific genital infection, responds dramatically to the 2-step treatment method with FURACIN. In one 3-year study involving treatment with FURACIN Suppositories Veterinary, of approximately one-half of 530 "problem breeders": "The average number of services per conception was 1.88 in the treated and 2.85 in the untreated cows. The average number of days between calvings was 385 in the treated and 447 in the untreated animals."[1]

In a study with 85 subfertile dairy cows, 61.7% of 34 treated with an intra-uterine injection of FURACIN Solution Veterinary conceived at first service, while only 19.3% of 31 treated in an identical manner with 10% saline solution conceived at first service; 40% of 20 non-treated controls conceived at first service.[2]

FURACIN 2-Step Method for Impaired Fertility

STEP 1. During estrus, instill, aseptically, the contents of 1 to 3 SQUEEJETS (30 to 90 cc.) of FURACIN Solution Veterinary into the uterus by means of a uterine pipette.



STEP 2. During the following 3 weeks, insert 1 FURACIN Suppository Veterinary into the anterior portion of the vagina 3 times each week on alternate days.

The cow may then be bred during the next estrus.

Supply: FURACIN Solution Veterinary SQUEEJET (30 cc. each), boxes of 12; FURACIN Suppositories Veterinary, boxes of 12.

1. Vigue, R. F., et al.: J. Am. Vet. M. Ass. 134:308 (April 1) 1959.
2. Vigue, R. F.: Personal communication.

EATON LABORATORIES, Division of The Norwich Pharmacal Company, NORWICH, NEW YORK

APPLICATIONS

Applicants Not Members of Constituent Associations

In accordance with paragraph (c) of Section 1, Article I, of the Bylaws, the names of applicants who are not members of constituent associations shall be published in the JOURNAL. Written comments received by the Executive Secretary from any active member regarding the application as published, will be furnished to the Judicial Council for its consideration prior to acceptance of the application.

TEKELI, SAIT
Yenisehir Tuna Cad. Atag Sok. No: 10/2
Ankara, Turkey
D.V.M., University of Ankara, 1954.
Vouchers: S. H. McNutt and Albert J. Luedke.

HEMPHILL, FRAZIER E.
310 Harder Pl.
Spokane 72, Wash.
D.V.M., Tuskegee Institute, 1955.
Voucher: Dale B. Johnsen and Douglas D. Jones.

Pine Needles May Cause Abortion in Beef Cows

Consumption of pine needles by pregnant cows may cause abortion. The most dangerous time is during the latter part of gestation. No beef cows involved in a 3-year study at Colorado State University aborted in less than 170 days after breeding, regardless of the length of time they had been eating needles. In the last 3 months of the gestation period, abortion occurred within as little as 2 weeks after the cattle were put on a daily ration of pine needles.

Apparently, feeding an adequate ration will not stop cattle from eating needles. In certain instances, range cattle of all ages were observed to eat needles greedily while receiving a satisfactory ration. Experimental cattle ate as much as 5 lb. of needles per day.

Study of pine needle abortion commenced after reports were received concerning abortions in range cattle in mountain areas where no infectious agents could be found. —*Rocky Mountain Vet., 8, (1960): 9.*

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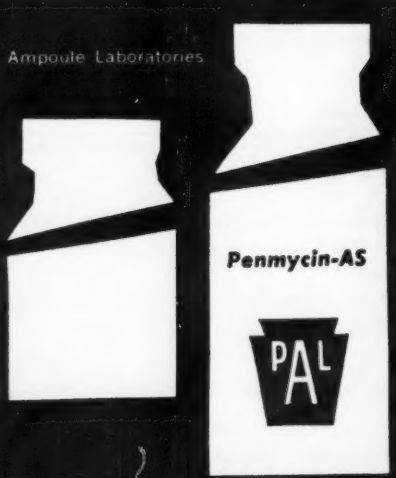

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HERE'S HOW IT WORKS—

1. Members of Gaines Kennel Plan receive a packet of coupons—each worth $7.50.

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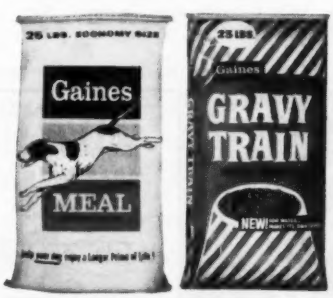
3. Gaines then sends you a check for $7.50. That's a savings of $1.50 on every 100 lbs. Send for details today!



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Name of kennel (if any)_____

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Offer not good in Kansas or outside U. S.

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Results reported to profession only within 96 hours. Other professional diagnostic laboratory services available. Write for free information.

Coming Meetings

Notices of coming meetings must be received 30 days before date of publication.

American Animal Hospital Association. Regional Meetings. Dr. Frank R. Booth, 3920 E. Jackson Blvd., Elkhart, Ind., executive secretary.

Region 1. Roosevelt Hotel, Pittsburgh, Pa., Jan. 15, 1961. Shoreham Hotel, Washington, D. C., Feb. 8-10, 1961. Buffalo Academy of Veterinary Medicine, Buffalo, N.Y., March 16, 1961.

Region 2. Buena Vista Hotel, Biloxi, Miss., Feb. 11-13, 1961. Miami Regional, Miami, Fla., Feb., 1961.

Region 3. Commodore Perry Hotel, Toledo, Ohio, Nov. 30, 1960.

Region 4. Oklahoma State University, Stillwater, Okla., Jan. 22, 1961. Texas V.M.A. Meeting, Houston, Texas, Jan. 30, 1961. Colorado State University, Fort Collins, Col., Feb. 19, 1961.

Central Indiana Veterinary Association. Fifth Regional Conference on the Nitorfurans in Veterinary Medicine. Co-sponsored with Eaton Laboratories. Sheraton-Lincoln Hotel, Indianapolis, Ind., Nov. 16, 1960. Dr. Charles Stengel, 3230 Winfield Ave., Indianapolis, Ind., president.

Midwest Small Animal Association. Hotel Burlington, Burlington, Iowa, Nov. 16-17, 1960. Dr. J. Porter Coble, 2828 S. MacArthur Blvd., Springfield, Ill., secretary.

Kentucky Veterinary Medical Association. Sterility Short Course. Phoenix Hotel, Lexington, Ky., Dec. 5-6, 1960. Dr. L. S. Shirrell, 545 East Main, Frankfort, Ky., secretary.

Prince Edward Island Veterinary Medical Association. Charlottetown, Prince Edward Island, Dec. 7, 1960. Dr. George C. Fisher, 188 Prince St., Charlottetown, Prince Edward Island, secretary.

American Association of Equine Practitioners. Annual meeting. Westward Ho Hotel, Phoenix, Ariz., Dec. 12-14, 1960. Dr. M. B. Teigland, 2560 State Service Rd., Opa Locka, Fla., secretary-treasurer.

Veterinary-Nutrition Conference. Sponsored by Midwest Feed Manufacturers Association and Iowa, Kansas, Missouri, Oklahoma, and Nebraska Veterinary Medical Associations. Continental Hotel, Kansas City, Mo., Dec. 12-13, 1960. Dr. James Bailey, Walnut Grove Products Co., Atlantic, Iowa, chairman.

(*Continued on adv. p.* 48)

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World's Largest and Oldest Manufacturing Specialists

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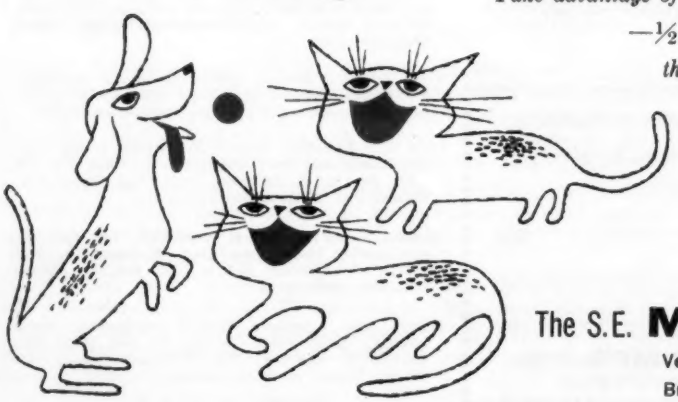
Take advantage of our introductory offer —½ dozen bottles free with the purchase of 3 dozen.



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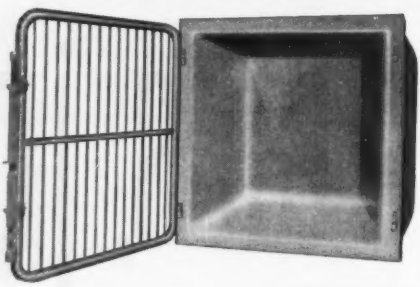

The finest cage you can buy and at a remarkably low price.

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(Continued from adv. p. 46)

New York State Veterinary College. Fifty-third annual conference for veterinarians. Cornell University, Ithaca, N.Y., Jan. 4-6, 1961. Dr. George C. Poppensiek, New York State Veterinary College, Cornell University, Ithaca, N.Y., dean.

American Veterinary Radiology Society. Mid-year meeting. Hotel Severin, Indianapolis, Ind., Jan. 10, 1961. Dr. J. J. Fishler, 3421 S. Main St., Elkhart, Ind., secretary.

Intermountain Veterinary Medical Association. Thirty-third annual meeting. Newhouse Hotel, Salt Lake City, Utah, Jan. 11-14 1961. Mr. Peter B. Woolley, 306 Ness Building, 28 West Second South, Salt Lake City, Utah, manager.

Kansas Veterinary Medical Association. Fifty-seventh annual convention. Broadview Hotel, Wichita, Jan. 15-17, 1961. Dr. M. W. Osburn, Kansas State University, Division of Extension, Manhattan, Kan., secretary-treasurer.

Wisconsin Veterinary Medical Association. Forty-fifth annual meeting. Schroeder Hotel, Milwaukee, Wis., Jan. 15-17, 1961. W. J. O'Rourke, 540 W. Washington Ave., Madison 3, Wis., secretary.

Pennsylvania, University of. Sixty-first annual conference of veterinarians. University of Pennsylvania School of Veterinary Medicine, Jan. 17-18, 1961. Dr. Donald Patterson, School of Veterinary Medicine, University of Pennsylvania, program chairman.

Tennessee Veterinary Medical Association. Annual meeting. Noel Hotel, Nashville, Tenn., Jan. 22-24, 1961. Dr. H. W. Hayes, 5009 Clinton Pike, Knoxville, Tenn., secretary.

Arkansas Veterinary Medical Association. Annual meeting. Hotel Marion, Little Rock, Jan. 22-24, 1961. Thayer D. Hendrickson, 7824 Cantrell Rd., Little Rock, Ark., secretary-treasurer.

Minnesota Veterinary Medical Association. Annual meeting. Leamington Hotel, Minneapolis, Minn., Jan. 23-25, 1961. B. S. Pomeroy, 1443 Raymond Ave., St. Paul 8, Minn., secretary.

Louisiana State University. Short Course for veterinarians, Pleasant Hall, Louisiana State University campus, Baton Rouge, Jan. 24-25, 1961. Dr. R. B. Lank, Department of Veterinary Science, Louisiana State University, chairman.

Ontario Veterinary Association. Eighty-seventh annual meeting. Royal York Hotel, Toronto, Ont., Jan. 26-28, 1961. Dr. R. J. Humble, Ontario Veterinary College, Guelph, Ont., chairman.

Texas Veterinary Medical Association. Annual convention. Rice Hotel, Houston, Jan. 29-31, 1961. Dr. King Gibson, 3906 Lemmon Ave., Dallas, Texas, co-chairman.

Ohio State Veterinary Medical Association. Annual meeting. Commodore Perry Hotel, Toledo, Ohio, Feb. 5-8, 1961. Dr. R. E. Rebrassier, 1411 West Third Ave., Columbus 12, Ohio, executive secretary.

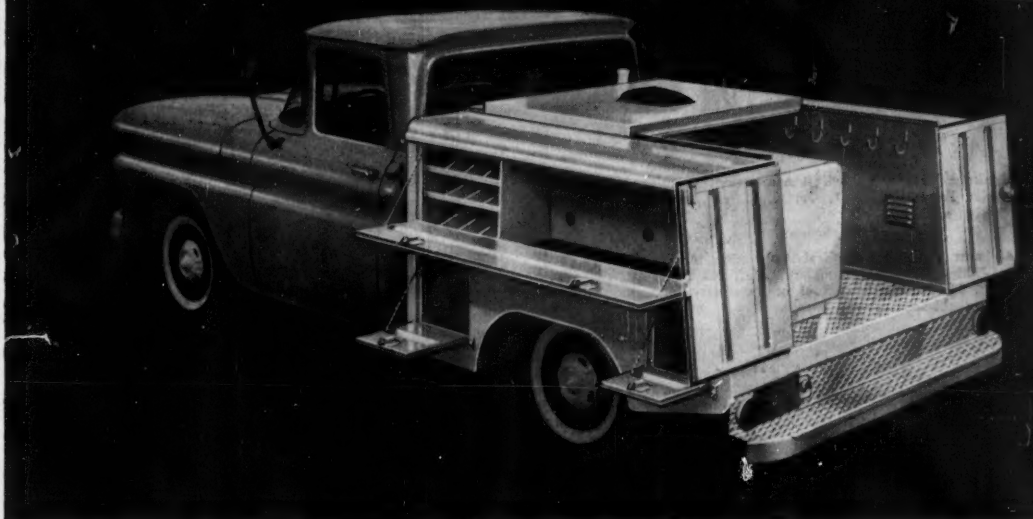
Missouri Veterinary Medical Association. Sixty-ninth annual meeting. Hotel Statler-Hilton, St. Louis, Feb. 19-21, 1961. Paul L. Spencer, D.V.M., P.O. Box 283, Jefferson City, Mo., secretary.

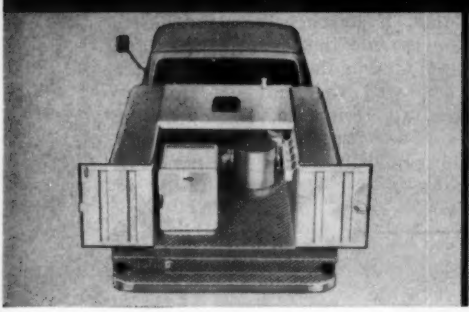
Illinois State Veterinary Medical Association. Annual meeting. LaSalle Hotel, Chicago, Ill., Feb. 20-22, 1961. Dr. C. B. Hostetler, 1385 Whitcomb Avenue, Des Plaines, Illinois, executive secretary.

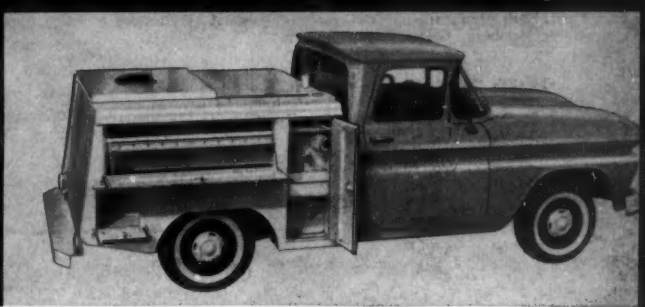
(Continued on adv. p. 50)

Service-Master
VETERINARIANS SERVICE BODY

carries a complete laboratory and office to the patient







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Every detail, every feature of this specially-equipped unit is designed to assist you in the field. Standard size fits any ½ ton chassis, old or new. Models can also be furnished for ¾, 1 and 1½ ton chassis. For completeness, for the best time-saving design and equipment, for the finest quality construction and durability you're way ahead with Service-Master. Compare and you'll see why.

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(Continued from adv. p. 48)

Manitoba Veterinary Medical Association. Winnipeg, Manitoba, Feb. 27-28, 1961. Dr. K. Warren, Killorney, Manitoba, secretary.

Alabama Veterinary Medical Association. Annual meeting. Whitley Hotel, Montgomery, Ala., March 19-21, 1961. Dr. M. K. Heath, School of Veterinary Medicine, Auburn, Ala., secretary.

Foreign Meetings

Fourth International Congress on Animal Reproduction. The Hague, Netherlands, June 5-9, 1961. For additional information contact: the Secretariat of the Fourth International Congress on Animal Reproduction, 14, Burgemeester de Monchyplein, The Hague, Netherlands, Dr. L. Hoedemaker, secretary to the organizing committee.

Eighth International Congress of Animal Husbandry. Hamburg, Germany, June 13, 1961.

Twelfth World's Poultry Congress. Show Grounds of the New South Wales Royal Agricultural Society, Sydney, Australia, Aug. 13-18, 1962. Dr. Cliff D. Carpenter, chairman, U. S. Participation Committee, 1207 Emerald Bay, Laguna Beach, Calif.; Dr. A. William Jasper, secretary, c/o AFBF, 2300 Merchandise Mart, Chicago 54, Ill.

Myzon Laboratories Appoints New Executive Vice-President

Dr. Harold E. Downing (ISU) has recently been appointed executive vice-president and general manager of Myzon Laboratories in Chicago.

After several years in practice after graduation from veterinary college, Dr. Downing became a specialist in veterinary research with Chas. Pfizer & Co. He joined the Myzon staff as director of research in 1955 and was later appointed vice-president and technical director, a position he held until his recent promotion.

Improper Administration of Worm Remedy Ruled as Negligence

A South Dakota court held it proper for the jury to find negligence in the administration of a worm remedy where there was evidence that, if improperly administered, the fluid passes into the animal's lungs and causes strangulation and where, from the facts, it appeared that out of 90 sheep treated by the veterinarian, 41 died during the afternoon and night following treatment and another 19 died during the next few days. — *Illinois Vet.*, 3, (*Spring*, 1960): 48.

Equine Anesthesia—A Recent Development in the Administration

		Produced by Abbott Laboratories in cooperation with	
16 mm., sound	Color, running time 11½ min.	Dr. E. W. Jones, College of Vet. Med., Okla. State Univ.	Rental $1.50

This film demonstrates two recently developed techniques that permit smooth and rapid anesthesia in the horse. The first shows general anesthesia of short duration, with mention of tests to determine surgical anesthesia. The second presents surgical anesthesia by combining intravenous and inhalation techniques. A description of the use of mask, absorber, vaporizer, and oxygen supply accompanies the description of the latter technique. There is minimum emphasis of the company's products. This film is recommended for student and professional audiences but not for lay audiences.

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PERSONAL WANT ADS—$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

TOTAL WORD COUNT must include complete box number address (7 words) or personal address line.

COMMERCIAL WANT ADS—$5.00 for the first 25 words, 25 cents for each additional word; $1.00 for use of box number. (See paragraph above for total word count.)

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DEADLINES

1st of month issue — 8th of month preceding date of issue.

15th of month issue — 22nd of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the box number, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be sent to the advertiser.

Wanted—Veterinarians

Veterinarian wanted for the Ute Mountain Ute Tribe, Towaoc, Colo. Applications on form 57 will be received from graduate D.V.M.'s until position is filled. For further information, contact John L. Kelley, Cortez, Colo., (phone LO 5-7317 days only), or Chas. D. Whitehorn, Cortez, Colo. (LO 5-7317 days and LO 5-3240 nights.) Mailing address is Towaoc, Colo.

Position of supervisor of laboratory animal service open to New York State residents. Salary—$5,000 to $6,000. Requires degree in biological sciences and one year's experience in care and breeding of animals used for laboratory purposes. Experience in pet store, humane society, zoo, circus, hospital, college, or laboratory may be acceptable. For details write Recruitment Unit, Box 70-B, New York State Department of Civil Service, State Campus, 1220 Washington Ave., Albany, N.Y.

Wanted—experienced veterinarian for small animal practice. Good starting salary. State experience and background. Virginia license required. Address Box L 3, JOURNAL of the AVMA.

Wanted at once—veterinarian for small animal practice on Chicago's north side. Salary open. Address Box L 56, JOURNAL of the AVMA.

CALIFORNIA STATE VETERINARY POSITIONS

Excellent opportunities in California state government in either disease control and pathology or meat hygiene for graduate veterinarians with or without experience in practice. Senior veterinary students eligible to apply before graduation. Salary range—$584 to $710. Liberal employee benefits. Write at once for further information. CALIFORNIA STATE PERSONNEL BOARD, 801 Capitol Avenue, Sacramento 14, Calif.

VETERINARIAN

A Midwest Pharmaceutical Company has opportunity for a veterinarian to render veterinary service to animals at research farm and participate in clinical investigations. Large animal experience required and graduate training desirable. Position will afford professional growth and opportunity with expanding research staff. Salary commensurate with experience and background. Please send complete resume to Box L 55, JOURNAL of the AVMA.

Wanted—veterinarian for progressive and expanding mixed practice in western Pennsylvania. Can lead to partnership or purchase. License not required to start. Address Box L 21, JOURNAL of the AVMA.

Wanted—veterinarian for small animal hospital. Some experience preferred. Good hours, excellent working conditions, pleasant clientele. Salary—$125 to $150 a week, depending on qualifications. Opening now. Midwest city. Address Box L 11, JOURNAL of the AVMA.

Fine opportunity for qualified small animal veterinarian in large hospital. Massachusetts license required. Good hours. Salary commensurate with experience, background, and training. Insurance and retirement benefits. Annual paid vacation and sick leave. Living quarters furnished for single man or woman. Write stating experience and qualifications. Address Box L 25, JOURNAL of the AVMA.

Wanted—assistant for mixed practice in Missouri. Opportunity for ownership by right party. State experience and salary expected in first letter. Address Box L 26, JOURNAL of the AVMA.

Wanted—veterinary inspector. Licensed graduate of an accredited veterinary college. Important benefits offered in addition to excellent opportunities for advancement. Salary—$6,863 with experience in field of public health. Address Cincinnati Health Dept., Div. of Meat and Dairy Inspection, City Hall, Cincinnati 2, Ohio.

Employment opportunities available with the Oregon State Department of Agriculture in meat inspection assignments. Salary range—$550 to $685 with liberal benefits under Civil Service. Oregon offers ideal living conditions and excellent recreation facilities. For additional information, write the Personnel Officer, Oregon Department of Agriculture, Salem, Ore.

Industrial position available for recent graduate for diagnostic and research work, mainly with poultry. Histopathology training desired. Please send information on personal and professional background to Box L 62, JOURNAL of the AVMA.

Wanted immediately—veterinarian for young, well-equipped hospital with above-average potential in suburban Maryland. Salary, percentage, eventual partnership. Address Box L 50, JOURNAL of the AVMA.

Wanted—the Agricultural Division of American Cyanamid Company is seeking a veterinarian with 3 to 5 years' experience with large animals and poultry, to locate at our Agricultural Center in Princeton, N. J. Responsible for design of clinical, laboratory and field trials, analyzing experimental results and making recommendations for terminating or expanding experiments leading to new veterinary products. Address Personnel Relations, Agricultural Division, American Cyanamid Company, P. O. Box 672, Princeton, N. J.

Wanted—the Agricultural Division of American Cyanamid Company is seeking a veterinarian with 2 to 5 years' experience for the position of regional technical service representative in the Southwest Region with headquarters in Dallas, Texas. Responsible for promotion and service of technical programs. Address Personnel Relations, Agricultural Division, American Cyanamid Company, P. O. Box 672, Princeton, N. J.

Wanted—veterinarian, for large animal practice in Oklahoma. Give details including experience and salary requirements. Address Box L 53, JOURNAL of the AVMA.

Wanted—associate veterinarian for mixed practice in northern Virginia, leading to partnership. Address Box L 52, JOURNAL of the AVMA.

Wanted—Positions

Graduating student (KSU '61), age 29, 4 children, looking for best opportunity, not specific type of practice. Prefer position in Wisconsin, Iowa, or Illinois. Home town—Bloomington, Wis. Available for interview December 19 to 31. Address Wallace Rogers, 8 W. Campus Ct., Manhattan, Kan.

WSU graduate, licensed in Washington, Oregon, and California, desires position with future in fast-stepping small animal practice. No area preference. Completes services obligation with USAF in March, 1961. Experience, definite aptitude, and interest in metropolitan small animal practice. Valuable experience in kennel management of sentry dogs. Address Box L 58, JOURNAL of the AVMA.

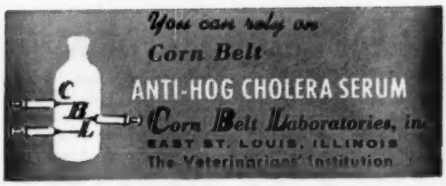
For Sale or Lease—Practices

For sale or lease—Kansas hospital and residence. Well-established. Address Box L 19, JOURNAL of the AVMA.

For sale—Illinois mixed practice, established 9 years and still growing, 15 per cent small animal. Will sell for value of real estate; drugs and equipment optional. Address Box K 1, JOURNAL of the AVMA.

For sale—outstanding small animal hospital on San Francisco peninsula. Ideal 2-man practice, exclusive location, unlimited possibilities, completely equipped. Capacity—200. Substantial capital required. Address Box H 61, JOURNAL of the AVMA.

For sale—general practice, 50 per cent small animal and cattle, located in eastern Kansas town of 12,000. Modern clinic with all equipment. Average annual gross more than $30,000. Reason for selling—other interests. Address Box L 61, JOURNAL of the



For sale—Chattanooga, Tenn., small animal practice, drugs and equipment. 40 cages and 20 outside runs. Good location and well-established practice grossing more than $25,000 yearly. Price—$10,000. Address Box L 60, JOURNAL of the AVMA.

For sale—small animal practice. Excellent location, reasonable. Long Island, N.Y. Address Box L 59, JOURNAL of the AVMA.

For sale—large animal practice in eastern Wisconsin. Good business location in neat, active, small community. Home, office building and furnishings, grounds, parking area. Price consideration for immediate sale. Address Box L 57, JOURNAL of the AVMA.

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Provides an accurate pattern against which to cut with knife or razor blade. Cannot move or slip when clamped into position. Made of non-rusting cast aluminum, highly polished. Simplicity of design and construction reduces possibility of breakage or mechanical failure. Forms immediately available for these breeds: Boxer, Boston Terrier, Great Dane, Doberman. $15, postpaid. Set of these four —$50, postpaid. Forms for other breeds made on special order. Sold to veterinarians only. Send check or money order.

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2126 Forest Road **Lansing 10, Mich.**

For sale—fully-equipped small animal hospital, 95 feet, on main thoroughfare in Miami, Fla. Asking realty value and inventory. Address Box L 54, JOURNAL of the AVMA.

For sale—fully-equipped Montana hospital. 24 inside kennels, 16 outside kennels with 24 outside runways. Barn, corrals, 2-car garage, 4-bedroom house. Practice 70 per cent small animals; balance beef cattle and horses. Address Box L 51, JOURNAL of the AVMA.

Wanted—Practices

Wanted to buy or lease—small animal hospital in northern California. Would consider buying interest in 2- or 3-man small animal practice. Ten years' experience in general practice. Address Box L 2, JOURNAL of the AVMA.

Wanted—veterinarian desires to purchase small animal or mixed pratice in Wisconsin or Indiana. Address Box L 63, JOURNAL of the AVMA.

Miscellaneous

For sale—boilable U.S.P. plain surgical gut, type A, size 00. Each tube contains 5 feet of gut, packed with xylol. Send $1.25 for each dozen. Postage prepaid. Minimum order—6 dozen. Address Sydney R. Forkash Memorial Hospital, 2544 W. Montrose Ave., Chicago 18, Ill.

Pregnancy diagnosis in mares—45th to 150th day. Request mailing tubes: $7.00. Address Pregnancy Diagnostic Laboratories, Dysart, Iowa.

Wanted—old style quick release snaps and non-slip pulleys no longer handled by veterinary supply houses. Contact A. F. Schauffler, D.V.M., Star Route, Cottonwood, Ariz. Telephone ME 4-8803.

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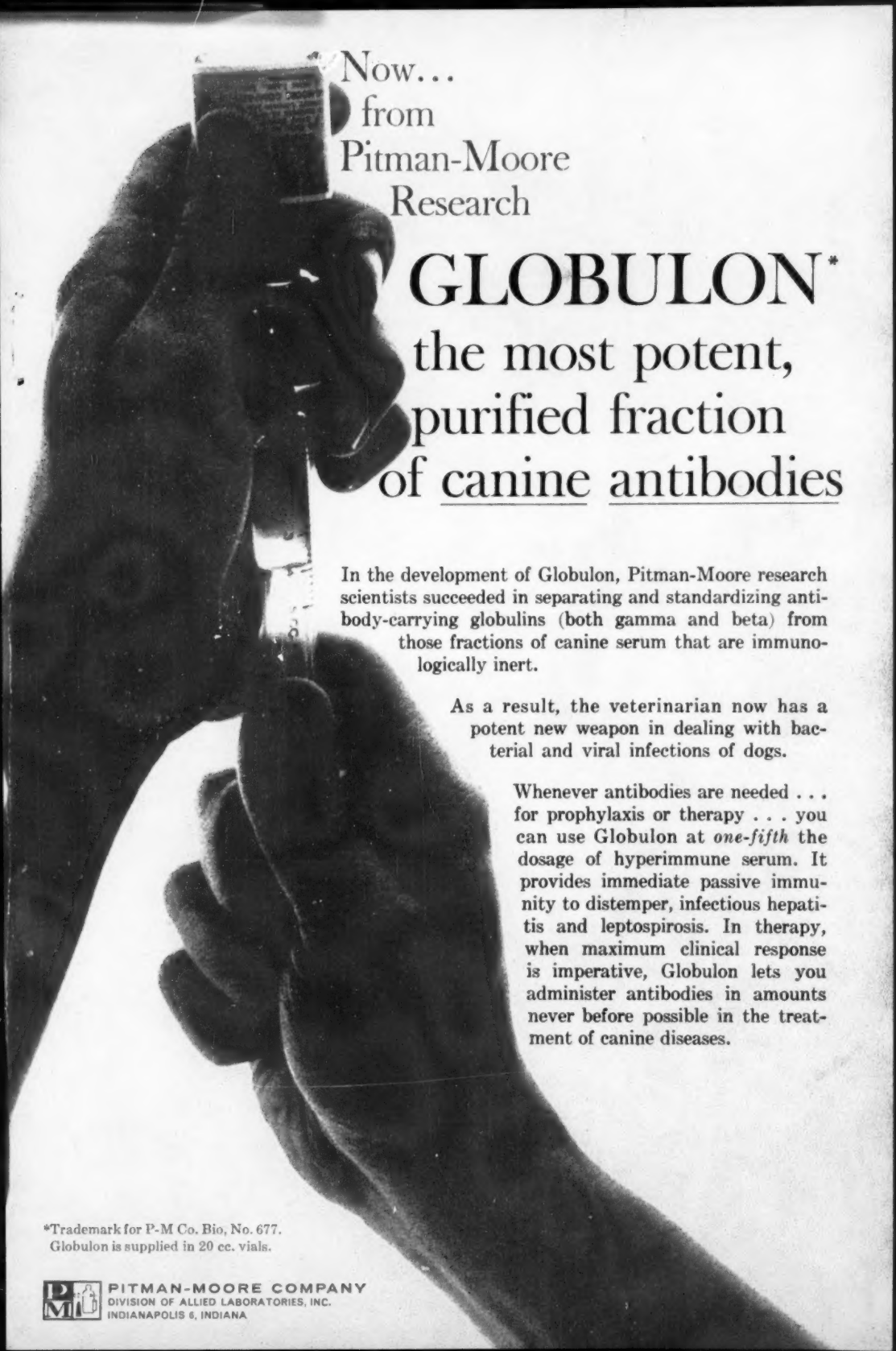

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